



VOLUME III

APPENDIX H  
COMPUTER SIMULATIONS

# FEASIBILITY STUDY FOR INSTALLATION OF UMCS FORT RILEY, KANSAS

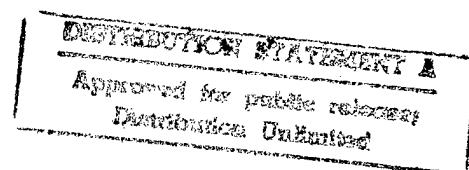
ENERGY ENGINEERING ANALYSIS PROGRAM (EEAP)

Prepared for

U.S. ARMY CORPS OF ENGINEERS  
KANSAS CITY DISTRICT  
KANSAS CITY, MISSOURI

Under

U.S. ARMY ENGINEER DISTRICT, MOBILE  
INDEFINITE DELIVERY A-E CONTRACT  
CONTRACT NO. DACA01-94-D-0033  
DELIVERY ORDER NO. 0001



DENVER, COLORADO  
ATLANTA, GEORGIA




DEPARTMENT OF THE ARMY  
CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, CORPS OF ENGINEERS  
P.O. BOX 9005  
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Librarian Engineering



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**VOLUME III**

**APPENDIX H  
COMPUTER SIMULATIONS**

**FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
FORT RILEY, KANSAS**

**ENERGY ENGINEERING ANALYSIS PROGRAM (EEAP)**

Prepared for

U.S. Army Corps of Engineers  
Kansas City District  
Kansas City, Missouri

Under

Contract No. DACA01-94-D-0033  
Delivery Order 0001  
EMC No. 1406-001

FOR QUALITY CONTROL

July 1995

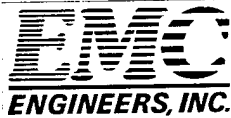
1997 10/7 189

By

E M C Engineers, Inc.  
2750 S. Wadsworth, Suite C-200  
Denver, Colorado 80227  
303/988-2951

**COMPUTER ENERGY SIMULATIONS**

**BLDG. 5000  
FIRE STATION**



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

BUILDING NO.:  
BLDG. TYPE:

5000  
FIRE STATION

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

## ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3 | RUN4 | RUN5 |
|----------------|---------|---------|---------|------|------|------|
| HEATING (MBtu) | 275.6   | 254.4   | 226.2   | 0.0  | 0.0  | 0.0  |
| COOLING (kWH)  | 119,666 | 119,645 | 114,483 | 0    | 0    | 0    |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 4,320 CFM                         |
| FLOOR AREA     | 4,667 FT <sup>2</sup>             |
| CFMI           | 1512 CFM                          |
| UA             | 582 BTU/HR-°F                     |
| BLDG CONSTR.   | 1 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

### EZDOE COMPUTER RUN DEFINITION:

|         |                             |
|---------|-----------------------------|
| BASERUN | EXISTING OPERATION          |
| RUN1    | NIGHT SETBACK               |
| RUN2    | DDC CONTROL                 |
| RUN3    | ECONOMIZER                  |
| RUN4    | NIGHTTIME INFILTRATION (OA) |
| RUN5    | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      | ANNUAL HEATING & COOLING HOURS |                           |
|--------------------|-------------------|------|--------------------------------|---------------------------|
| M-F                | 0                 | 2400 | 120 HR                         | HR. ON HEATING 5448 HR/YR |
| SAT.               | 0                 | 2400 | 24 HR                          | HR. ON COOLING 3312 HR/YR |
| SUN.               | 0                 | 2400 | 24 HR                          | HR. OFF HEATING 0 HR/YR   |
|                    | TOTAL OCCUPY HR.  |      | 168 HR/WK                      | HR. OFF COOLING 0 HR/YR   |
|                    | TOTAL UNOCC. HR.  |      | 0 HR/WK                        |                           |
|                    | ANNUAL OCCUPY HR. |      | 8760 HR/YR                     |                           |
|                    | ANNUAL UNOCC. HR. |      | 0 HR/YR                        |                           |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING

8760 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY

5448 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

3312 HR/YR

HRS SAVED (HTG ONLY)

5448

5448

=

0 HR/YR

HRS SAVED (CLG ONLY)

3312

3312

=

0 HR/YR

|           |   |   |               |           |                     |
|-----------|---|---|---------------|-----------|---------------------|
| HOAUHC    | 275.56 MBtu   | - | 0 MBtu        | =         | 0.00E+00 Btu/CFM-HR |
|           | 1512 CFM  | x | 0 HR/YR       |           |                     |
| HOAUH     | 275.56 MBtu   | - | 0 MBtu        | =         | 0.00E+00 Btu/CFM-HR |
|           | 1512 CFM  | x | 0 HR/YR       |           |                     |
| COAUHC    | 119,666.0 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 1512 CFM  | x | 0 HR/YR       |           |                     |
| COAUC     | 119,666.0 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 1512 CFM  | x | 0 HR/YR       |           |                     |
| HOAOHC    | 275.56 MBtu   | - | 0 MBtu        | =         | 0.00E+00 Btu/CFM-HR |
|           | 1512 CFM  | x | 8760 HR/YR    |           |                     |
| HOAOH     | 275.56 MBtu   | - | 0 MBtu        | =         | 0.00E+00 Btu/CFM-HR |
|           | 1512 CFM  | x | 5448 HR/YR    |           |                     |
| COAOHC    | 119,666.0 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 1512 CFM  | x | 8760 HR/YR    |           |                     |
| COAOC     | 119,666.0 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 1512 CFM  | x | 3312 HR/YR    |           |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | =         | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | =         | 0.17                |
| ECC       | 119,645.5 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 4320 CFM  | x | 3312 HR/YR    |           |                     |
| ECHC      | 119,645.5 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 4320 CFM  | x | 8760 HR/YR    |           |                     |
| NSUCHC    | 119,666.0 kWH   | - | 119,645.5 kWH | =         | 0.00E+00 kWH/CFM-HR |
|           | 4320 CFM  | x | 0 HR/YR       |           |                     |
| NSUCC     | 119,666.0 kWH   | - | 119,645.5 kWH | =         | 0.00E+00 kWH/CFM-HR |
|           | 4320 CFM  | x | 0 HR/YR       |           |                     |
| DDCCHC    | 119,666.0 kWH   | - | 114,482.9 kWH | =         | 1.37E-04 kWH/CFM-HR |
|           | 4320 CFM  | x | 8760 HR/YR    |           |                     |
| DDCCC     | 119,666.0 kWH   | - | 114,482.9 kWH | =         | 3.62E-04 kWH/CFM-HR |
|           | 4320 CFM  | x | 3312 HR/YR    |           |                     |
| NSC       | 275.56 MBtu   | - | 254.39 MBtu   | =         | 3.64E+04 Btu/UA     |
|           | 581.544 UA  |   |               |           |                     |
| DDCH      | 275.56 MBtu   | - | 226.18 MBtu   | =         | 8.49E+04 Btu/UA     |
|           | 581.544 UA  |   |               |           |                     |
| OPT       | (2 HR/DAY X 240 DAY/YR)                               |   |               | 132 HR/YR |                     |
|           |   |   |               | =         | 0 HR/YR             |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               |           |                     |
|           |   |   |               | =         | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01          | =         | 5.67 HR/YR          |



INPUT LOADS ..

```

$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION OF BLDG. #5000      *
        LINE-5 *FIRE STATION      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
LOADS-REPORT  VERIFICATION=(LV-D)
              SUMMARY=(LS-C,LS-D)
              HOURLY-DATA-SAVE = YES ..

BUILDING-LOCATION  LATITUDE = 39.0
                  LONGITUDE = 96.5
                  ALTITUDE = 1065.
                  TIME-ZONE = 6
                  GROSS-AREA = 4666.5
                  SHIELDING-COEF = 0.29
                  X-REF = 0.0
                  Y-REF = 0.0 ..

RUN-PERIOD      JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

```

LD_ON      =DAY-SCHEDULE  (1,24) (1.) ..

LD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..

LD_LITES   =DAY-SCHEDULE  (1,5) (0.)
                  (6,7) (0.5)
                  (8,21) (1.)
                  (22,23) (0.5)
                  (24) (0.) ..

LD_KIT/EQP =DAY-SCHEDULE  (1,5) (0.)
                  (6) (0.1)
                  (7,8) (0.15)
                  (9,13) (0.1,0.,0.25,0.6,0.25)
                  (14,16) (0.)
                  (17) (0.25)
                  (18,19) (0.55)
                  (20) (0.15)
                  (21,24) (0.) ..

```

LW\_LITES =WEEK-SCHEDULE (ALL) LD\_LITES ..

LW\_KIT/EQP =WEEK-SCHEDULE (ALL) LD\_KIT/EQP ..

LW\_ON =WEEK-SCHEDULE (ALL) LD\_ON ..

LW\_OFF =WEEK-SCHEDULE (ALL) LD\_OFF ..

\$ ON 100% OF THE TIME

L\_ON =SCHEDULE THRU DEC 31 LW\_ON ..

\$ OFF 100% OF THE TIME

L\_OFF =SCHEDULE THRU DEC 31 LW\_OFF ..

\$ LIGHTING LOAD

L\_LITES =SCHEDULE THRU DEC 31 LW\_LITES ..

\$ KITCHEN EQUIPMENT LOAD

L\_KIT/EQP =SCHEDULE THRU DEC 31 LW\_KIT/EQP ..

#### \$ CONSTRUCTION TYPES

##### \$ EXTERIOR WALL ASB FACIA AL BATT

WALL-1 =LAYERS MATERIAL=(AB02,PW03,AL21,IN02,GP02) I-F-R= 0.6100  
THICKNESS=(0.021,0.042,0.000,0.296,0.052) ..

EXWALL-1 =CONSTRUCTION LAYERS = WALL-1  
ABSORPTANCE = 0.880  
ROUGHNESS = 2 ..

FLOOR =CONSTRUCTION U-VALUE = 0.020  
ABSORPTANCE = 0.610  
ROUGHNESS = 5 ..

##### \$ BUILT-UP ROOF W/INSL& NO CEILING

BLT-ROOF =LAYERS MATERIAL=(HF-E2,HF-E3,HF-A3,IN47,AL33,AC01)  
THICKNESS=(0.042,0.031,0.005,0.333,0.000,0.031) ..

ROOF-1 =CONSTRUCTION LAYERS = BLT-ROOF  
ABSORPTANCE = 0.800  
ROUGHNESS = 1 ..

##### \$ STANDARD METAL DOOR

DOOR-MET =CONSTRUCTION U-VALUE = 0.020  
ABSORPTANCE = 0.860  
ROUGHNESS = 5 ..

##### \$ EXTERIOR WALL ASB AL FACI AL BATT

WALL-2 =LAYERS MATERIAL=(AB02,AL21,PW03,AL21,IN02,GP02) I-F-R= 0.6100  
THICKNESS=(0.021,0.000,0.042,0.000,0.296,0.052) ..

EXWALL-2 =CONSTRUCTION LAYERS = WALL-2  
ABSORPTANCE = 0.880  
ROUGHNESS = 2 ..

2\_PN\_STD =GLASS-TYPE      GLASS-TYPE-CODE = 2  
                          PANES = 2 ..

## \$ SPACE DESCRIPTION

S\_PERI-ZON =SPACE      AREA = 1779.3    VOLUME = 24019.9  
                          TEMPERATURE = (73.)    ZONE-TYPE = CONDITIONED  
                          PEOPLE-SCHEDULE = L\_ON    AREA/PERSON = 311.0  
                          PEOPLE-HG-LAT = 625.0    PEOPLE-HG-SENS = 375.0  
                          LIGHTING-TYPE = SUS-FLUOR    LIGHTING-W/SQFT = 1.5  
                          LIGHT-TO-SPACE = 1.0    LIGHTING-SCHEDULE = L\_LITES  
                          EQUIP-SCHEDULE = L\_LITES    EQUIPMENT-KW = 0.3  
                          SOURCE-SENSIBLE = 0.0    FURN-WEIGHT = 0.5  
                          INF-METHOD = NONE ..

E-W      HEIGHT = 9.0    WIDTH = 73.0    CONS = EXWALL-1  
                          AZIMUTH = 180    SKY-FORM-FACTOR = 0.5  
                          GND-FORM-FACTOR = 0.5    ..

WINDOW HEIGHT = 2.5    WIDTH = 3.5    G-T = 2\_PN\_STD  
                          MULTIPLIER = 16.0    SKY-FORM-FACTOR = 0.5  
                          GND-FORM-FACTOR = 0.5    ..

E-W      HEIGHT = 4.5    WIDTH = 73.0    CONS = EXWALL-2  
                          AZIMUTH = 180    SKY-FORM-FACTOR = 0.5  
                          GND-FORM-FACTOR = 0.5    ..

E-W      HEIGHT = 9.0    WIDTH = 32.5    CONS = EXWALL-1  
                          AZIMUTH = 270    SKY-FORM-FACTOR = 0.5  
                          GND-FORM-FACTOR = 0.5    ..

DOOR      HEIGHT = 7.5    WIDTH = 3.5    CONS = DOOR-MET  
                          SETBACK = 0.2    SKY-FORM-FACTOR = 0.5  
                          GND-FORM-FACTOR = 0.5    ..

E-W      HEIGHT = 3.0    WIDTH = 32.5    CONS = EXWALL-2  
                          AZIMUTH = 270    SKY-FORM-FACTOR = 0.5  
                          GND-FORM-FACTOR = 0.5    ..

U-W      HEIGHT = 37.0    WIDTH = 48.0    CONS = FLOOR ..

ROOF      HEIGHT = 37.0    WIDTH = 48.0    CONS = ROOF-1  
                          TILT = 0    SKY-FORM-FACTOR = 1.0    ..

N\_PERI\_ZON =SPACE      AREA = 1333.5    VOLUME = 18002.3  
                          TEMPERATURE = (73.)    ZONE-TYPE = CONDITIONED  
                          PEOPLE-SCHEDULE = L\_ON    AREA/PERSON = 311.0  
                          PEOPLE-HG-LAT = 625.0    PEOPLE-HG-SENS = 375.0  
                          LIGHTING-TYPE = SUS-FLUOR    LIGHTING-W/SQFT = 1.5  
                          LIGHTING-KW = 0.67    LIGHT-TO-SPACE = 1.0  
                          LIGHTING-SCHEDULE = L\_LITES



EQUIP-SCHEDULE = L\_KIT/EQUP EQUIPMENT-KW = 11.91  
 SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.5  
 INF-METHOD = NONE ..

E-W HEIGHT = 9.0 WIDTH = 54.0 CONS = EXWALL-1  
 AZIMUTH = 0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 6.0 WIDTH = 8.0 G-T = 2\_PN\_STD  
 MULTIPLIER = 4.0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 4.5 WIDTH = 54.0 CONS = EXWALL-2  
 AZIMUTH = 0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 9.0 WIDTH = 36.5 CONS = EXWALL-1  
 AZIMUTH = 270 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 3.0 WIDTH = 36.5 CONS = EXWALL-2  
 AZIMUTH = 270 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 31.0 WIDTH = 43.0 CONS = FLOOR ..

ROOF HEIGHT = 31.0 WIDTH = 43.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

CORE\_ZONE =SPACE AREA = 1553.8 VOLUME = 20975.6  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_ON AREA/PERSON = 311.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.5  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITES  
 EQUIP-SCHEDULE = L\_ON EQUIPMENT-KW = 0.98  
 SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.5  
 INF-METHOD = NONE ..

U-W HEIGHT = 27.5 WIDTH = 56.5 CONS = FLOOR ..

ROOF HEIGHT = 27.5 WIDTH = 65.5 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION OF BLDG. #5000      *
        LINE-5 *FIRE STATION                                * ..

ABORT      ERRORS      ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
SD_S_CL_F  =DAY-SCHEDULE (1,24) (72.) ..
SD_W_HT_F  =DAY-SCHEDULE (1,24) (74.) ..
SD_W_CL_F  =DAY-SCHEDULE (1,24) (74.1) ..
SD_S_HT_F  =DAY-SCHEDULE (1,24) (71.9) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..
SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_S_CL_F  =WEEK-SCHEDULE (ALL) SD_S_CL_F ..
SW_W_HT_F  =WEEK-SCHEDULE (ALL) SD_W_HT_F ..
SW_W_CL_F  =WEEK-SCHEDULE (ALL) SD_W_CL_F ..
SW_S_HT_F  =WEEK-SCHEDULE (ALL) SD_S_HT_F ..

```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..
```

## \$ HEATING SEASON

```
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
                THRU OCT 1 SW_OFF
                THRU DEC 31 SW_ON ..

```

## \$ COOLING SEASON

```
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
                THRU OCT 1 SW_ON
                THRU DEC 31 SW_OFF ..

```

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
 THRU OCT 1 SW\_S\_HT\_F  
 THRU DEC 31 SW\_W\_HT\_F ..

S\_HR\_REPOT =SCHEDULE THRU JAN 14 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU AUG 20 SW\_OFF  
 THRU AUG 21 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
 THRU OCT 1 SW\_S\_CL\_F  
 THRU DEC 31 SW\_W\_CL\_F ..

## \$ ZONE DESCRIPTION

S\_PERI-ZON =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.1  
 SIZING-OPTION = FROM-LOADS ..

N\_PERI\_ZON =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.1  
 SIZING-OPTION = FROM-LOADS ..

CORE\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.1  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ\_SYSTEM =SYSTEM SYSTEM-TYPE = PMZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED HEAT-SET-T = 120.0  
 COOL-SET-T = 55.0 OA-CONTROL = FIXED  
 SUPPLY-CFM = 4155. RATED-CFM = 4155.  
 MIN-OUTSIDE-AIR = 0.35 MAX-OA-FRACTION = 0.35  
 SUPPLY-DELTA-T = 2.1 SUPPLY-KW = 0.00069  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF MIN-CFM-RATIO = 1.0  
 COOLING-CAPACITY = 118900. COOL-SH-CAP = 87000.  
 HEATING-CAPACITY = -233300. CRANKCASE-HEAT = 1.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (S\_PERI-ZON, N\_PERI\_ZON, CORE\_ZONE) ..

## \$ HOURLY REPORT DESCRIPTION

```

ZONE_1      =REPORT-BLOCK VARIABLE-TYPE = S_PERI-ZON
              VARIABLE-LIST = (17,18,7,6) ..
AHU          =REPORT-BLOCK VARIABLE-TYPE = MZ_SYSTEM
              VARIABLE-LIST = (1,2,3,4,18,19,5,6) ..
ZONE_2      =REPORT-BLOCK VARIABLE-TYPE = N_PERI_ZON
              VARIABLE-LIST = (17,18,7,6) ..
ZONE_3      =REPORT-BLOCK VARIABLE-TYPE = CORE_ZONE
              VARIABLE-LIST = (17,18,7,6) ..
S_ZONE      = HOURLY-REPORT REPORT-SCHEDULE = S_HR_REPOT
              REPORT-BLOCK = (ZONE_1,AHU)
..
AHU_VARIAB = HOURLY-REPORT REPORT-SCHEDULE = S_HR_REPOT
              REPORT-BLOCK = (AHU)
..
N_ZONE      = HOURLY-REPORT REPORT-SCHEDULE = S_HR_REPOT
              REPORT-BLOCK = (ZONE_2)
..
COR_ZON     = HOURLY-REPORT REPORT-SCHEDULE = S_HR_REPOT
              REPORT-BLOCK = (ZONE_3)
..
END ..
COMPUTE SYSTEMS ..

```

INPUT PLANT ..

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *
        LINE-4 *BASELINE SIMULATION OF BLDG. #5000      *
        LINE-5 *FIRE STATION      * ..

```

```

ABORT          ERRORS ..
DIAGNOSTIC     WARNINGS ..
PLANT-REPORT   VERIFICATION=(PV-A)
                SUMMARY=(PS-B,BEPS)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON          =DAY-SCHEDULE (1,24) (1.) ..
PD_OFF         =DAY-SCHEDULE (1,24) (0.) ..

```

PW\_ON =WEEK-SCHEDULE (ALL) PD\_ON ..  
PW\_OFF =WEEK-SCHEDULE (ALL) PD\_OFF ..

## \$ HEATING SEASON

P\_HEAT =SCHEDULE THRU MAY 15 PW\_ON  
THRU OCT 1 PW\_OFF  
THRU DEC 31 PW\_ON ..

## \$ COOLING SEASON

P\_COOL =SCHEDULE THRU MAY 15 PW\_OFF  
THRU OCT 1 PW\_ON  
THRU DEC 31 PW\_OFF ..

## \$ EQUIPMENT DESCRIPTION

BOILER-HW =PLANT-EQUIPMENT TYPE = HW-BOILER  
SIZE = -999. ..

CHILL-DX =PLANT-EQUIPMENT TYPE = HERM-REC-CHLR  
SIZE = -999. ..

PLANT-PARAMETERS BOILER-FUEL = NATURAL-GAS HERM-REC-COND-TYPE = AIR  
CCIRC-HEAD = 0.0 HCIRC-HEAD = 10.0  
HCIRC-DESIGN-T-DROP = 20.0 ..

ENERGY-RESOURCE RESOURCE = ELECTRICITY ..  
ENERGY-RESOURCE RESOURCE = NATURAL-GAS ..

END ..  
COMPUTE PLANT ..  
STOP ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:59:18 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION OF BLDG. #5000 FIRE STATION TOPEKA, KS  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT

NUMBER OF EXTERIOR SURFACES 11 RECTANGULAR 11 OTHER 0  
 (U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED )

| SURFACE    | SPACE | U-VALUE<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | WALL<br>AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | WALL<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) | AZIMUTH   |
|------------|-------|----------------------------|-------------------------|----------------------------|------------------------|----------------------------|-------------------------|----------------------------|------------------------|--------------------------------|-----------|
| N PERI_ZON |       | 0.490                      | 192.00                  | 0.068                      | 0.068                  | 0.234                      | 294.00                  | 0.068                      | 294.00                 | 486.00                         | NORTH     |
| N_PERI_ZON |       | 0.000                      | 0.00                    | 0.064                      | 0.064                  | 0.064                      | 243.00                  | 0.064                      | 243.00                 | 243.00                         | NORTH     |
| S_PERI_ZON |       | 0.490                      | 140.00                  | 0.068                      | 0.068                  | 0.158                      | 517.00                  | 0.158                      | 517.00                 | 657.00                         | SOUTH     |
| S_PERI_ZON |       | 0.000                      | 0.00                    | 0.064                      | 0.064                  | 0.064                      | 328.50                  | 0.064                      | 328.50                 | 328.50                         | SOUTH     |
| S_PERI_ZON |       | 0.000                      | 0.00                    | 0.068                      | 0.068                  | 0.068                      | 292.50                  | 0.068                      | 292.50                 | 292.50                         | WEST      |
| S_PERI_ZON |       | 0.000                      | 0.00                    | 0.064                      | 0.064                  | 0.064                      | 97.50                   | 0.064                      | 97.50                  | 97.50                          | WEST      |
| N_PERI_ZON |       | 0.000                      | 0.00                    | 0.068                      | 0.068                  | 0.068                      | 328.50                  | 0.068                      | 328.50                 | 328.50                         | WEST      |
| N_PERI_ZON |       | 0.000                      | 0.00                    | 0.064                      | 0.064                  | 0.064                      | 109.50                  | 0.064                      | 109.50                 | 109.50                         | WEST      |
| S_PERI_ZON |       | 0.000                      | 0.00                    | 0.036                      | 0.036                  | 0.036                      | 1776.00                 | 0.036                      | 1776.00                | 1776.00                        | ROOF      |
| N_PERI_ZON |       | 0.000                      | 0.00                    | 0.036                      | 0.036                  | 0.036                      | 1333.00                 | 0.036                      | 1333.00                | 1333.00                        | ROOF      |
| CORE_ZONE  |       | 0.000                      | 0.00                    | 0.036                      | 0.036                  | 0.036                      | 1801.25                 | 0.036                      | 1801.25                | 1801.25                        | ROOF      |
| S_PERI_ZON |       | 0.000                      | 0.00                    | 0.020                      | 0.020                  | 0.020                      | 1776.00                 | 0.020                      | 1776.00                | 1776.00                        | UNDERGRND |
| N_PERI_ZON |       | 0.000                      | 0.00                    | 0.020                      | 0.020                  | 0.020                      | 1333.00                 | 0.020                      | 1333.00                | 1333.00                        | UNDERGRND |
| CORE_ZONE  |       | 0.000                      | 0.00                    | 0.020                      | 0.020                  | 0.020                      | 1553.75                 | 0.020                      | 1553.75                | 1553.75                        | UNDERGRND |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:59:18 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION OF BLDG. #5000 FIRE STATION TOPEKA, KS  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT

|             | AVERAGE<br>U-VALUE/GLASS<br>(BTU/HR-SQFT-F) | AVERAGE<br>U-VALUE/WALLS<br>(BTU/HR-SQFT-F) | AVERAGE U-VALUE<br>WALLS+GLASS<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | OPAQUE<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) |
|-------------|---|---|---|-------------------------|--------------------------|--------------------------------|
| NORTH       | 0.490                                       | 0.066                                       | 0.178   | 192.00                  | 537.00                   | 729.00                         |
| SOUTH       | 0.490                                       | 0.066                                       | 0.126   | 140.00                  | 845.50                   | 985.50                         |
| WEST        | 0.000                                       | 0.067                                       | 0.067   | 0.00                    | 828.00                   | 828.00                         |
| ROOF        | 0.000                                       | 0.036                                       | 0.036   | 0.00                    | 4910.25                  | 4910.25                        |
| ALL WALLS   | 0.490                                       | 0.066                                       | 0.122   | 332.00                  | 2210.50                  | 2542.50                        |
| WALLS+ROOFS | 0.490                                       | 0.045                                       | 0.065   | 332.00                  | 7120.75                  | 7452.75                        |
| UNDERGRND   | 0.000                                       | 0.020                                       | 0.020   | 0.00                    | 4662.75                  | 4662.75                        |
| BUILDING    | 0.490                                       | 0.035                                       | 0.048   | 332.00                  | 11783.50                 | 12115.50                       |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:59:18 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION OF BLDG. #5000 FIRE STATION  
 REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS

\*\*\* BUILDING \*\*\*

FLOOR AREA 4667 SQFT 434 SQMT  
 VOLUME 62998 CUFT 1784 CUMT

COOLING LOAD HEATING LOAD  
 =====  
 TIME DRY-BULB TEMP WET-BULB TEMP  
 AUG 4 6PM JAN 15 5AM  
 92F 33C -8F -22C  
 70F 21C -9F -23C

|                      | SENSIBLE (KBTU/H) ( KW ) |                | LATENT (KBTU/H) ( KW ) |       | SENSIBLE (KBTU/H) ( KW ) |                |
|----------------------|--------------------------|----------------|------------------------|-------|--------------------------|----------------|
| WALLS                | 5.442                    | 1.594          | 0.000                  | 0.000 | -11.726                  | -3.434         |
| ROOFS                | 11.284                   | 3.305          | 0.000                  | 0.000 | -9.323                   | -2.731         |
| GLASS CONDUCTION     | 1.979                    | 0.580          | 0.000                  | 0.000 | -13.072                  | -3.829         |
| GLASS SOLAR          | 10.219                   | 2.993          | 0.000                  | 0.000 | 0.870                    | 0.255          |
| DOOR                 | 0.052                    | 0.015          | 0.000                  | 0.000 | -0.134                   | -0.039         |
| INTERNAL SURFACES    | 0.000                    | 0.000          | 0.000                  | 0.000 | 0.000                    | 0.000          |
| UNDERGROUND SURFACES | -0.441                   | -0.129         | 0.000                  | 0.000 | -1.785                   | -0.523         |
| OCCUPANTS TO SPACE   | 5.627                    | 1.648          | 9.378                  | 2.747 | 3.753                    | 1.099          |
| LIGHT TO SPACE       | 24.308                   | 7.119          | 0.000                  | 0.000 | 3.469                    | 1.016          |
| EQUIPMENT TO SPACE   | 21.276                   | 6.231          | 0.000                  | 0.000 | 1.085                    | 0.318          |
| PROCESS TO SPACE     | 0.000                    | 0.000          | 0.000                  | 0.000 | 0.000                    | 0.000          |
| INFILTRATION         | 0.000                    | 0.000          | 0.000                  | 0.000 | 0.000                    | 0.000          |
| TOTAL LOAD           | 79.746                   | 23.356         | 9.378                  | 2.747 | -26.864                  | -7.868         |
| TOTAL LOAD / AREA    | 89.124 KBTU/H            | 26.102 KW      |                        |       | -26.864 KBTU/H           | -7.868 KW      |
|                      | 19.10BTU/H.SQFT          | 60.207 W /SQMT |                        |       | 5.757BTU/H.SQFT          | 18.148 W /SQMT |

\*\*\*\*\*  
 \* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR \*  
 \* LOADS \*  
 \* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION \*  
 \* IN CONSIDERATION \*  
 \*\*\*\*\*

EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:59:18 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION OF BLDG. #5000 FIRE STATION  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ\_SYSTEM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                   |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -49.094                     | 15                      | 5                    | -8.F                 | -9.F                                    | 8003.                     | 19.956                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -34.759                     | 3                       | 5                    | -1.F                 | -2.F                                    | 7193.                     | 18.956                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -24.629                     | 4                       | 5                    | 14.F                 | 12.F                                    | 7957.                     | 18.956                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -5.136                      | 5                       | 5                    | 31.F                 | 29.F                                    | 7701.                     | 18.956                          |
| MAY   | 19.02822                    | 31                      | 16                   | 88.F                 | 75.F                                    | -0.659                      | 5                       | 5                    | 44.F                 | 40.F                                    | 9709.                     | 31.032                          |
| JUN   | 51.40051                    | 24                      | 12                   | 84.F                 | 76.F                                    | 0.000                       |                         |                      |                      |   | 12457.                    | 31.318                          |
| JUL   | 69.27947                    | 1                       | 16                   | 86.F                 | 80.F                                    | 0.000                       |                         |                      |                      |   | 14363.                    | 31.889                          |
| AUG   | 65.85220                    | 20                      | 13                   | 92.F                 | 78.F                                    | 0.000                       |                         |                      |                      |   | 14261.                    | 31.736                          |
| SEP   | 34.29221                    | 22                      | 18                   | 85.F                 | 75.F                                    | 0.000                       |                         |                      |                      |   | 10882.                    | 31.165                          |
| OCT   | 0.81302                     | 1                       | 18                   | 83.F                 | 68.F                                    | -3.490                      | 20                      | 5                    | 25.F                 | 25.F                                    | 8035.                     | 29.008                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -18.773                     | 3                       | 5                    | 13.F                 | 12.F                                    | 7701.                     | 18.956                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -42.321                     | 12                      | 5                    | 4.F                  | 3.F                                     | 7958.                     | 18.956                          |
| TOTAL | 240.665                     |                         |                      |                      | 141.854                                 | -178.861                    |                         |                      |                      |   | 116219.                   | 31.889                          |

EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:59:18 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION OF BLDG. #5000 FIRE STATION  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ\_SYSTEM TOPEKA, KS

| MONTH  | HOURS                    |                          |                   | N U M B E R                |                            |                            | O F                          |                           |                             | H O U R S  |  |  | --COINCIDENT LOADS-- |  |  |
|--------|--------------------------|--------------------------|-------------------|----------------------------|----------------------------|----------------------------|------------------------------|---------------------------|-----------------------------|--|--|--|----------------------|--|--|
|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | COOL-HEAT<br>LOAD | HOURS<br>HEATING<br>AVAIL. | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |                      |  |  |
| JAN    | 0                        | 744                      | 0                 | 744                        | 0                          | 744                        | 744                          | 0                         | 0                           | -60.222  | 3.847  |  |                      |  |  |
| FEB    | 0                        | 672                      | 0                 | 672                        | 0                          | 744                        | 672                          | 0                         | 0                           | -58.174  | 3.847  |  |                      |  |  |
| MAR    | 0                        | 744                      | 0                 | 744                        | 0                          | 744                        | 744                          | 0                         | 0                           | -61.906  | 3.847  |  |                      |  |  |
| APR    | 0                        | 720                      | 0                 | 720                        | 0                          | 720                        | 720                          | 0                         | 0                           | -1.775   | 3.847  |  |                      |  |  |
| MAY    | 244                      | 360                      | 140               | 360                        | 384                        | 744                        | 744                          | 0                         | 140                         | 0.000  | 24.295   |  |                      |  |  |
| JUN    | 564                      | 0                        | 156               | 0                          | 720                        | 720                        | 720                          | 0                         | 156                         | 0.000  | 31.086   |  |                      |  |  |
| JUL    | 707                      | 0                        | 37                | 0                          | 744                        | 744                        | 744                          | 0                         | 37                          | 0.000  | 24.691   |  |                      |  |  |
| AUG    | 686                      | 0                        | 58                | 0                          | 744                        | 744                        | 744                          | 0                         | 58                          | 0.000  | 27.751   |  |                      |  |  |
| SEP    | 410                      | 0                        | 310               | 0                          | 720                        | 720                        | 720                          | 0                         | 310                         | 0.000  | 30.654   |  |                      |  |  |
| OCT    | 11                       | 720                      | 13                | 720                        | 24                         | 744                        | 744                          | 0                         | 13                          | 0.000  | 29.008   |  |                      |  |  |
| NOV    | 0                        | 720                      | 0                 | 720                        | 0                          | 720                        | 720                          | 0                         | 0                           | -77.140  | 3.847  |  |                      |  |  |
| DEC    | 0                        | 744                      | 0                 | 744                        | 0                          | 744                        | 744                          | 0                         | 0                           | -76.802  | 3.847  |  |                      |  |  |
| ANNUAL | 2622                     | 5424                     | 714               | 5424                       | 3336                       | 8760                       | 0                            | 0                         | 714                         |  |  |  |                      |  |  |



EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:59:18 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE BASELINE SIMULATION OF BLDG. #5000 FIRE STATION  
 REPORT- PS-B TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|-----|--|---|---|
| JAN | 71.294<br>216.188<br>15/5                        | 29.860<br>72.103<br>15/12                           | 216.188<br>52.768<br>15/5                           |
| FEB | 193.981<br>3/5                                   | 26.727<br>68.688<br>17/12                           | 193.981<br>38.822<br>3/5                            |
| MAR | 155.443<br>4/5                                   | 28.923<br>68.688<br>29/12                           | 155.443<br>10.010<br>4/5                            |
| APR | 105.133<br>5/5                                   | 26.914<br>65.910<br>4/12                            | 105.133<br>2.002<br>5/5                             |
| MAY | 46.419<br>5/5                                    | 33.317<br>105.957<br>31/18                          | 46.419<br>0.000<br>5/5                              |
| JUN | 0.000<br>30/1                                    | 42.535<br>106.933<br>28/12                          | 0.000<br>30/1<br>0.000                              |
| JUL | 0.000<br>31/1                                    | 49.043<br>108.881<br>23/12                          | 0.000<br>31/1<br>0.000                              |
| AUG | 0.000<br>31/1                                    | 48.695<br>108.360<br>21/12                          | 0.000<br>31/1<br>0.000                              |
| SEP | 0.000<br>30/1                                    | 37.154<br>106.409<br>7/12                           | 0.000<br>30/1<br>7.424                              |
| OCT | 116.889<br>20/5                                  | 27.931<br>99.046<br>1/18                            | 116.889<br>20/5<br>30.173                           |
| NOV | 154.836<br>3/5                                   | 27.708<br>67.920<br>30/12                           | 154.836<br>3/5<br>63.063                            |
| DEC | 180.953<br>12/5                                  | 29.608<br>68.688<br>31/12                           | 180.953<br>12/5<br>275.557                          |
|     | ONE YEAR<br>USE/PEAK                             | 408.414<br>108.881                                  | 216.188   |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:59:18 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION OF BLDG. #5000 FIRE STATION  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 10.72       | 275.56      |
| SPACE COOL      | 76.93       | 0.00        |
| HVAC AUX        | 86.62       | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 152.87      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 81.27       | 0.00        |
| TOTAL           | 408.42      | 275.56      |

TOTAL SITE ENERGY 683.97 MBTU 146.6 KBTU/SQFT-YR GROSS-AREA 146.6 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1502.03 MBTU 321.9 KBTU/SQFT-YR GROSS-AREA 321.9 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 3.3  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

```

```

        LINE-4 *RUN #1 NIGHT SETBACK OF BLDG. #5000      *

```

```

        LINE-5 *FIRE STATION      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE  (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..
SD_S_CL_F  =DAY-SCHEDULE  (1,24) (72.) ..
SD_W_HT_F  =DAY-SCHEDULE  (1,4) (65.)
                (5,21) (74.)
                (22,24) (65.) ..
SD_W_CL_F  =DAY-SCHEDULE  (1,4) (65.1)
                (5,21) (74.1)
                (22,24) (65.1) ..
SD_S_HT_F  =DAY-SCHEDULE  (1,24) (71.9) ..

SW_ON      =WEEK-SCHEDULE  (ALL) SD_ON ..
SW_OFF     =WEEK-SCHEDULE  (ALL) SD_OFF ..

SW_S_CL_F  =WEEK-SCHEDULE  (ALL) SD_S_CL_F ..
SW_W_HT_F  =WEEK-SCHEDULE  (ALL) SD_W_HT_F ..
SW_W_CL_F  =WEEK-SCHEDULE  (ALL) SD_W_CL_F ..
SW_S_HT_F  =WEEK-SCHEDULE  (ALL) SD_S_HT_F ..

```

## \$ FULL ON SYSTEM

```

S_ON      =SCHEDULE THRU DEC 31 SW_ON ..

```

## \$ FULL OFF SYSTEM

```

S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..

```

## \$ HEATING SEASON

```

S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
                THRU OCT 1 SW_OFF
                THRU DEC 31 SW_ON ..

```

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
 THRU OCT 1 SW\_S\_HT\_F  
 THRU DEC 31 SW\_W\_HT\_F ..

S\_HR\_REPOT =SCHEDULE THRU JAN 14 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU AUG 20 SW\_OFF  
 THRU AUG 21 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
 THRU OCT 1 SW\_S\_CL\_F  
 THRU DEC 31 SW\_W\_CL\_F ..

## \$ ZONE DESCRIPTION

S\_PERI-ZON =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.1  
 SIZING-OPTION = FROM-LOADS ..

N\_PERI\_ZON =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.1  
 SIZING-OPTION = FROM-LOADS ..

CORE\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.1  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ\_SYSTEM =SYSTEM SYSTEM-TYPE = PMZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED HEAT-SET-T = 120.0  
 COOL-SET-T = 55.0 OA-CONTROL = FIXED  
 SUPPLY-CFM = 4155. RATED-CFM = 4155.  
 MIN-OUTSIDE-AIR = 0.35 MAX-OA-FRACTION = 0.35  
 SUPPLY-DELTA-T = 2.1 SUPPLY-KW = 0.00069  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
NIGHT-CYCLE-CTRL = STAY-OFF MIN-CFM-RATIO = 1.0  
 COOLING-CAPACITY = 118900. COOL-SH-CAP = 87000.

HEATING-CAPACITY = -233300. CRANKCASE-HEAT = 1.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (S\_PERI-ZON, N\_PERI\_ZON, CORE\_ZONE) ..

## \$ HOURLY REPORT DESCRIPTION

ZONE\_1 =REPORT-BLOCK VARIABLE-TYPE = S\_PERI-ZON  
           VARIABLE-LIST = (17,18,7,6) ..  
 AHU =REPORT-BLOCK VARIABLE-TYPE = MZ\_SYSTEM  
       VARIABLE-LIST = (1,2,3,4,18,19,5,6) ..  
 ZONE\_2 =REPORT-BLOCK VARIABLE-TYPE = N\_PERI\_ZON  
           VARIABLE-LIST = (17,18,7,6) ..  
 ZONE\_3 =REPORT-BLOCK VARIABLE-TYPE = CORE\_ZONE  
           VARIABLE-LIST = (17,18,7,6) ..  
 S\_ZONE = HOURLY-REPORT REPORT-SCHEDULE = S\_HR\_REPOT  
           REPORT-BLOCK = (ZONE\_1,AHU)  
 ..  
 AHU\_VARIAB = HOURLY-REPORT REPORT-SCHEDULE = S\_HR\_REPOT  
           REPORT-BLOCK = (AHU)  
 ..  
 N\_ZONE = HOURLY-REPORT REPORT-SCHEDULE = S\_HR\_REPOT  
           REPORT-BLOCK = (ZONE\_2)  
 ..  
 COR\_ZON = HOURLY-REPORT REPORT-SCHEDULE = S\_HR\_REPOT  
           REPORT-BLOCK = (ZONE\_3)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #1 NIGHT SETBACK OF BLDG. #5000 \*  
 LINE-5 \*FIRE STATION \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
           SUMMARY=(PS-B,BEPS)  
           HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOB-2.1D 5/15/1995 14:19:11 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK OF BLDG. #5000 FIRE STATION  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ\_SYSTEM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                           |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -44.919                     | 15                      | -8.F                 | -9.F                 | -208.905                                | 8003.                     | 19.956                          |
| FEB   | 0.00000                     |                         |                      |                      | -31.233                     | 3                       | -1.F                 | -2.F                 | -192.986                                | 7193.                     | 18.956                          |
| MAR   | 0.00000                     |                         |                      |                      | -21.536                     | 4                       | 14.F                 | 12.F                 | -157.481                                | 7957.                     | 18.956                          |
| APR   | 0.00000                     |                         |                      |                      | -4.247                      | 5                       | 31.F                 | 29.F                 | -104.523                                | 7701.                     | 18.956                          |
| MAY   | 19.02814                    | 31                      | 88.F                 | 75.F                 | -0.593                      | 5                       | 44.F                 | 40.F                 | -31.970                                 | 9709.                     | 31.032                          |
| JUN   | 51.40051                    | 24                      | 12                   | 84.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 12457.                    | 31.318                          |
| JUL   | 69.27947                    | 1                       | 16                   | 86.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 14363.                    | 31.889                          |
| AUG   | 65.85220                    | 20                      | 13                   | 92.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 14261.                    | 31.736                          |
| SEP   | 34.29221                    | 22                      | 18                   | 85.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 10882.                    | 31.165                          |
| OCT   | 0.81302                     | 1                       | 18                   | 83.F                 | -2.955                      | 20                      | 25.F                 | 25.F                 | -113.495                                | 8035.                     | 29.008                          |
| NOV   | 0.00000                     |                         |                      |                      | -16.194                     | 3                       | 13.F                 | 12.F                 | -156.962                                | 7701.                     | 18.956                          |
| DEC   | 0.00000                     |                         |                      |                      | -38.353                     | 12                      | 4.F                  | 3.F                  | -180.691                                | 7958.                     | 18.956                          |
| TOTAL | 240.665                     |                         |                      |                      | -160.031                    |                         |                      |                      | -208.905                                | 116219.                   | 31.889                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOB-2.1D 5/15/1995 14:19:11 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK OF BLDG. #5000 FIRE STATION  
 REPORT- SS-C, SYSTEM MONTHLY LOAD HOURS FOR MZ\_SYSTEM TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |                            |                   |                            |                            |                              |                           |                                      |  | --COINCIDENT LOADS--                           |  |
|--------|---------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |
| JAN    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -1.802   | 3.847  |  |
| FEB    | 0                         | 672                      | 0                          | 0                 | 672                        | 0                          | 672                          | 0                         | 0                                    | -1.016   | 3.847  |  |
| MAR    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -1.276   | 3.847  |  |
| APR    | 0                         | 720                      | 0                          | 0                 | 720                        | 0                          | 720                          | 0                         | 0                                    | -1.775   | 3.847  |  |
| MAY    | 244                       | 360                      | 0                          | 140               | 360                        | 384                        | 744                          | 0                         | 140                                  | 0.000  | 24.295   |  |
| JUN    | 564                       | 0                        | 0                          | 156               | 0                          | 720                        | 720                          | 0                         | 156                                  | 0.000  | 31.086   |  |
| JUL    | 707                       | 0                        | 0                          | 37                | 0                          | 744                        | 744                          | 0                         | 37                                   | 0.000  | 24.691   |  |
| AUG    | 686                       | 0                        | 0                          | 58                | 0                          | 744                        | 744                          | 0                         | 58                                   | 0.000  | 27.751   |  |
| SEP    | 410                       | 0                        | 0                          | 310               | 0                          | 720                        | 720                          | 0                         | 310                                  | 0.000  | 30.654   |  |
| OCT    | 11                        | 720                      | 0                          | 13                | 720                        | 24                         | 744                          | 0                         | 13                                   | 0.000  | 29.008   |  |
| NOV    | 0                         | 720                      | 0                          | 0                 | 720                        | 0                          | 720                          | 0                         | 0                                    | -13.139  | 3.847  |  |
| DEC    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -11.680  | 3.847  |  |
| ANNUAL | 2622                      | 5424                     | 0                          | 714               | 5424                       | 3336                       | 8760                         | 0                         | 714                                  |  |  |  |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 14:19:11 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK OF BLDG. #5000 FIRE STATION  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|-----|--|---|---|
| JAN | 29.958<br>72.970<br>15/12                        | 29.958<br>72.970<br>15/12                           | 67.191<br>263.524<br>15/5                           |
| FEB | 26.705<br>69.556<br>17/12                        | 26.705<br>69.556<br>17/12                           | 48.652<br>246.729<br>3/5                            |
| MAR | 28.842<br>69.556<br>30/12                        | 28.842<br>69.556<br>30/12                           | 34.921<br>208.411<br>4/5                            |
| APR | 26.877<br>66.431<br>4/12                         | 26.877<br>66.431<br>4/12                            | 8.933<br>149.052<br>5/5                             |
| MAY | 33.335<br>105.957<br>31/18                       | 33.335<br>105.957<br>31/18                          | 2.096<br>55.373<br>5/5                              |
| JUN | 42.535<br>106.933<br>28/12                       | 42.535<br>106.933<br>28/12                          | 0.000<br>30/1<br>0.000                              |
| JUL | 49.043<br>108.881<br>23/12                       | 49.043<br>108.881<br>23/12                          | 0.000<br>31/1<br>0.000                              |
| AUG | 48.695<br>108.360<br>21/12                       | 48.695<br>108.360<br>21/12                          | 0.000<br>31/1<br>0.000                              |
| SEP | 37.154<br>106.409<br>7/12                        | 37.154<br>106.409<br>7/12                           | 0.000<br>30/1<br>6.965                              |
| OCT | 27.933<br>99.046<br>1/18                         | 27.933<br>99.046<br>1/18                            | 159.294<br>20/5<br>26.910                           |
| NOV | 27.636<br>69.067<br>30/12                        | 27.636<br>69.067<br>30/12                           | 207.842<br>3/5<br>58.727                            |
| DEC | 29.633<br>69.556<br>31/12                        | 29.633<br>69.556<br>31/12                           | 233.595<br>12/5<br>254.394                          |
|     | ONE YEAR<br>USE/PEAK                             | 408.344<br>108.881                                  | 263.524   |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 14:19:11 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK OF BLDG. #5000 FIRE STATION  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 10.46       | 254.39      |
| SPACE COOL      | 76.93       | 0.00        |
| HVAC AUX        | 86.81       | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 152.87      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 81.27       | 0.00        |
| TOTAL           | 408.35      | 254.39      |

TOTAL SITE ENERGY 662.74 MBTU 142.0 KBTU/SQFT-YR GROSS-AREA 142.0 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1480.65 MBTU 317.3 KBTU/SQFT-YR GROSS-AREA 317.3 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 3.4  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #2 DDC CONTROL OF BLDG. #5000      *
        LINE-5 *FIRE STATION      * ..

ABORT      ERRORS      ..
DIAGNOSTIC      WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
SD_S_CL_F  =DAY-SCHEDULE (1,24) (76.) ..
SD_W_HT_F  =DAY-SCHEDULE (1,24) (70.) ..
SD_W_CL_F  =DAY-SCHEDULE (1,24) (70.1) ..
SD_S_HT_F  =DAY-SCHEDULE (1,24) (75.9) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..
SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_S_CL_F  =WEEK-SCHEDULE (ALL) SD_S_CL_F ..
SW_W_HT_F  =WEEK-SCHEDULE (ALL) SD_W_HT_F ..
SW_W_CL_F  =WEEK-SCHEDULE (ALL) SD_W_CL_F ..
SW_S_HT_F  =WEEK-SCHEDULE (ALL) SD_S_HT_F ..

```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..
```

## \$ HEATING SEASON

```
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
            THRU OCT 1 SW_OFF
            THRU DEC 31 SW_ON ..

```

## \$ COOLING SEASON

```
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
            THRU OCT 1 SW_ON
            THRU DEC 31 SW_OFF ..

```

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
 THRU OCT 1 SW\_S\_HT\_F  
 THRU DEC 31 SW\_W\_HT\_F ..

S\_HR\_REPOT =SCHEDULE THRU JAN 14 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU AUG 20 SW\_OFF  
 THRU AUG 21 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
 THRU OCT 1 SW\_S\_CL\_F  
 THRU DEC 31 SW\_W\_CL\_F ..

## \$ ZONE DESCRIPTION

S\_PERI-ZON =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.1  
 SIZING-OPTION = FROM-LOADS ..

N\_PERI\_ZON =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.1  
 SIZING-OPTION = FROM-LOADS ..

CORE\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.1  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ\_SYSTEM =SYSTEM SYSTEM-TYPE = PMZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED HEAT-SET-T = 120.0  
 COOL-SET-T = 55.0 OA-CONTROL = FIXED  
 SUPPLY-CFM = 4155. RATED-CFM = 4155.  
 MIN-OUTSIDE-AIR = 0.35 MAX-OA-FRACTION = 0.35  
 SUPPLY-DELTA-T = 2.1 SUPPLY-KW = 0.00069  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF MIN-CFM-RATIO = 1.0  
 COOLING-CAPACITY = 118900. COOL-SH-CAP = 87000.  
 HEATING-CAPACITY = -233300. CRANKCASE-HEAT = 1.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (S\_PERI-ZON, N\_PERI\_ZON, CORE\_ZONE) ..

## \$ HOURLY REPORT DESCRIPTION

```

ZONE_1      =REPORT-BLOCK VARIABLE-TYPE = S_PERI-ZON
              VARIABLE-LIST = (17,18,7,6) ..
AHU          =REPORT-BLOCK VARIABLE-TYPE = MZ_SYSTEM
              VARIABLE-LIST = (1,2,3,4,18,19,5,6) ..
ZONE_2      =REPORT-BLOCK VARIABLE-TYPE = N_PERI_ZON
              VARIABLE-LIST = (17,18,7,6) ..
ZONE_3      =REPORT-BLOCK VARIABLE-TYPE = CORE_ZONE
              VARIABLE-LIST = (17,18,7,6) ..
S_ZONE      = HOURLY-REPORT REPORT-SCHEDULE = S_HR_REPOT
              REPORT-BLOCK = (ZONE_1,AHU)
..
AHU_VARIAB = HOURLY-REPORT REPORT-SCHEDULE = S_HR_REPOT
              REPORT-BLOCK = (AHU)
..
N_ZONE      = HOURLY-REPORT REPORT-SCHEDULE = S_HR_REPOT
              REPORT-BLOCK = (ZONE_2)
..
COR_ZON     = HOURLY-REPORT REPORT-SCHEDULE = S_HR_REPOT
              REPORT-BLOCK = (ZONE_3)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #2 DDC CONTROL OF BLDG. #5000      *
        LINE-5 *FIRE STATION      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC WARNINGS ..
PLANT-REPORT VERIFICATION=(PV-A)
              SUMMARY=(PS-B,BEPS)
              HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON      =DAY-SCHEDULE (1,24) (1.) ..
PD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

```

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 14:28:11 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 RUN #2 DDC CONTROL OF BLDG. #5000 FIRE STATION                                |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ SYSTEM TOPEKA, KS                             |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| MONTH  | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                                 |
|  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN  | 0.00000                     |                         |                      |                      | -42.471                     | 15                      | -8.F                 | -9.F                 | -162.377                                | 8003.                              | 19.956                          |
| FEB  | 0.00000                     |                         |                      |                      | -28.888                     | 3                       | -1.F                 | -2.F                 | -141.440                                | 7193.                              | 18.956                          |
| MAR  | 0.00000                     |                         |                      |                      | -18.896                     | 4                       | 14.F                 | 12.F                 | -106.070                                | 7957.                              | 18.956                          |
| APR  | 0.00000                     |                         |                      |                      | -3.061                      | 5                       | 31.F                 | 29.F                 | -56.599                                 | 7701.                              | 18.956                          |
| MAY  | 13.44425                    | 31 18                   | 90.F                 | 76.F                 | -0.214                      | 1                       | 62.F                 | 53.F                 | -2.932                                  | 9218.                              | 31.020                          |
| JUN  | 39.20008                    | 27 15                   | 88.F                 | 77.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 11394.                             | 31.109                          |
| JUL  | 55.78997                    | 17 18                   | 88.F                 | 80.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 13188.                             | 31.804                          |
| AUG  | 54.11045                    | 20 13                   | 92.F                 | 78.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 13230.                             | 31.674                          |
| SEP  | 24.53618                    | 6 13                    | 88.F                 | 75.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 10027.                             | 30.939                          |
| OCT  | 0.43671                     | 1 18                    | 83.F                 | 68.F                 | -1.686                      | 20                      | 25.F                 | 25.F                 | -63.234                                 | 8001.                              | 26.784                          |
| NOV  | 0.00000                     |                         |                      |                      | -14.038                     | 3                       | 13.F                 | 12.F                 | -105.624                                | 7701.                              | 18.956                          |
| DEC  | 0.00000                     |                         |                      |                      | -35.787                     | 12                      | 4.F                  | 3.F                  | -129.340                                | 7958.                              | 18.956                          |
| TOTAL  | 187.518                     |                         |                      |                      | -145.041                    |                         |                      |                      | -162.377                                | 111569.                            | 31.804                          |
| MAX  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 14:28:11 SDL RUN 1 |                          |                          |  |                                 |                            |                            |                                    |                                      |  |  |                    |
|--|--------------------------|--------------------------|--|---------------------------------|----------------------------|----------------------------|------------------------------------|--------------------------------------|--|--|--------------------|
| DENVER, CO 80227 RUN #2 DDC CONTROL OF BLDG. #5000 FIRE STATION                                |                          |                          |  |                                 |                            |                            |                                    |                                      |  |  |                    |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ_SYSTEM TOPEKA, KS                                |                          |                          |  |                                 |                            |                            |                                    |                                      |  |  |                    |
| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | N U M B E R<br>O F<br>H O U R S | HOURS<br>COOLING<br>AVAIL. | HOURS<br>HEATING<br>AVAIL. | HOURS<br>FANS<br>ON<br>CYCLE<br>ON | HOURS<br>NIGHT<br>WHEN<br>FANS<br>ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | COINCIDENT LOADS-- |
| JAN  | 0                        | 744                      | 0  | 0                               | 744                        | 744                        | 0                                  | 0                                    | -48.945  | 3.847  |                    |
| FEB  | 0                        | 672                      | 0  | 0                               | 672                        | 672                        | 0                                  | 0                                    | -44.910  | 3.847  |                    |
| MAR  | 0                        | 744                      | 0  | 0                               | 744                        | 744                        | 0                                  | 0                                    | -51.195  | 3.847  |                    |
| APR  | 0                        | 720                      | 0  | 0                               | 720                        | 720                        | 0                                  | 0                                    | -1.774   | 3.847  |                    |
| MAY  | 187                      | 360                      | 0  | 197                             | 384                        | 744                        | 0                                  | 197                                  | 0.000  | 31.020   |                    |
| JUN  | 466                      | 0                        | 0  | 254                             | 720                        | 720                        | 0                                  | 254                                  | 0.000  | 24.207   |                    |
| JUL  | 617                      | 0                        | 0  | 127                             | 744                        | 744                        | 0                                  | 127                                  | 0.000  | 31.349   |                    |
| AUG  | 620                      | 0                        | 0  | 124                             | 744                        | 744                        | 0                                  | 124                                  | 0.000  | 27.756   |                    |
| SEP  | 324                      | 0                        | 0  | 396                             | 720                        | 720                        | 0                                  | 396                                  | 0.000  | 27.292   |                    |
| OCT  | 8                        | 720                      | 0  | 16                              | 24                         | 744                        | 0                                  | 16                                   | 0.000  | 26.784   |                    |
| NOV  | 0                        | 720                      | 0  | 0                               | 0                          | 720                        | 0                                  | 0                                    | -67.878  | 3.847  |                    |
| DEC  | 0                        | 744                      | 0  | 0                               | 0                          | 744                        | 0                                  | 0                                    | -67.814  | 3.847  |                    |
| ANNUAL   | 2222                     | 5424                     | 0  | 1114                            | 3336                       | 8760                       | 0                                  | 1114                                 |  |  |                    |

EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 14:28:11 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #2 DDC CONTROL OF BLDG. #5000 FIRE STATION  
 REPORT- PS-B TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR                   | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|-----|--|---|---|
| JAN | TOTAL (MBTU)<br>29.582<br>PEAK (KBTU)<br>71.894<br>DY/HR<br>15/12  | 29.582<br>71.894<br>15/12                           | 62.073<br>204.831<br>15/5                           |
| FEB | TOTAL (MBTU)<br>26.462<br>PEAK (KBTU)<br>68.480<br>DY/HR<br>17/12  | 26.462<br>68.480<br>17/12                           | 44.460<br>182.634<br>3/5                            |
| MAR | TOTAL (MBTU)<br>28.582<br>PEAK (KBTU)<br>68.101<br>DY/HR<br>29/12  | 28.582<br>68.101<br>29/12                           | 30.276<br>143.928<br>4/5                            |
| APR | TOTAL (MBTU)<br>26.752<br>PEAK (KBTU)<br>65.376<br>DY/HR<br>4/12   | 26.752<br>65.376<br>4/12                            | 6.687<br>87.249<br>5/5                              |
| MAY | TOTAL (MBTU)<br>31.594<br>PEAK (KBTU)<br>105.914<br>DY/HR<br>31/18 | 31.594<br>105.914<br>31/18                          | 1.225<br>7.223<br>1/20                              |
| JUN | TOTAL (MBTU)<br>38.906<br>PEAK (KBTU)<br>106.218<br>DY/HR<br>28/12 | 38.906<br>106.218<br>28/12                          | 0.000<br>0.000<br>30/1                              |
| JUL | TOTAL (MBTU)<br>45.031<br>PEAK (KBTU)<br>108.594<br>DY/HR<br>23/12 | 45.031<br>108.594<br>23/12                          | 0.000<br>0.000<br>31/1                              |
| AUG | TOTAL (MBTU)<br>45.172<br>PEAK (KBTU)<br>108.147<br>DY/HR<br>21/12 | 45.172<br>108.147<br>21/12                          | 0.000<br>0.000<br>31/1                              |
| SEP | TOTAL (MBTU)<br>34.236<br>PEAK (KBTU)<br>105.639<br>DY/HR<br>7/12  | 34.236<br>105.639<br>7/12                           | 0.000<br>0.000<br>30/1                              |
| OCT | TOTAL (MBTU)<br>27.656<br>PEAK (KBTU)<br>91.451<br>DY/HR<br>1/18   | 27.656<br>91.451<br>1/18                            | 4.439<br>95.024<br>20/5                             |
| NOV | TOTAL (MBTU)<br>27.429<br>PEAK (KBTU)<br>67.026<br>DY/HR<br>30/12  | 27.429<br>67.026<br>30/12                           | 23.117<br>143.430<br>3/5                            |
| DEC | TOTAL (MBTU)<br>29.326<br>PEAK (KBTU)<br>68.480<br>DY/HR<br>31/12  | 29.326<br>68.480<br>31/12                           | 53.909<br>169.563<br>12/5                           |
|     | ONE YEAR<br>USE/PEAK   | 390.727<br>108.594                                  | 226.187<br>204.831                                  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 14:28:11 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL OF BLDG. #5000 FIRE STATION  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

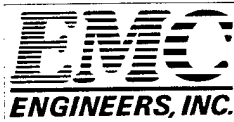
| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 8.96        | 226.18      |
| SPACE COOL      | 61.05       | 0.00        |
| HVAC AUX        | 86.57       | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 152.87      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 81.27       | 0.00        |
| TOTAL           | 390.73      | 226.18      |

TOTAL SITE ENERGY 616.91 MBTU 132.2 KBTU/SQFT-YR GROSS-AREA 132.2 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1399.54 MBTU 299.9 KBTU/SQFT-YR GROSS-AREA 299.9 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 5.6  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

**COMPUTER ENERGY SIMULATIONS**

**BLDG. 7450  
ADMINISTRATION BUILDINGS**





DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

BUILDING NO.:  
BLDG. TYPE:

7450  
REGIMENTAL HEADQUARTERS BUILDING

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

## ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3 | RUN4 | RUN5 |
|----------------|---------|---------|---------|------|------|------|
| HEATING (MBtu) | 293.3   | 150.6   | 250.9   | 0.0  | 0.0  | 0.0  |
| COOLING (kWH)  | 133,273 | 123,082 | 130,152 | 0    | 0    | 0    |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 9,800 CFM                         |
| FLOOR AREA     | 3,200 FT <sup>2</sup>             |
| CFM1           | 860 CFM                           |
| UA             | 1308 BTU/HR-°F                    |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

### EZDOE COMPUTER RUN DEFINITION:

|         |                             |
|---------|-----------------------------|
| BASERUN | EXISTING OPERATION          |
| RUN1    | NIGHT SETBACK               |
| RUN2    | DDC CONTROL                 |
| RUN3    | ECONOMIZER                  |
| RUN4    | NIGHTTIME INFILTRATION (OA) |
| RUN5    | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      |            | ANNUAL HEATING & COOLING HOURS |            |
|--------------------|-------------------|------|------------|--------------------------------|------------|
| M-F                | 600               | 1700 | 55 HR      | HR. ON HEATING                 | 1784 HR/YR |
| SAT.               | 0                 | 0    | 0 HR       | HR. ON COOLING                 | 1084 HR/YR |
| SUN.               | 0                 | 0    | 0 HR       | HR. OFF HEATING                | 3664 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 55 HR/WK   | HR. OFF COOLING                | 2228 HR/YR |
|                    | TOTAL UNOCC. HR.  |      | 113 HR/WK  |                                |            |
|                    | ANNUAL OCCUPY HR. |      | 2868 HR/YR |                                |            |
|                    | ANNUAL UNOCC. HR. |      | 5892 HR/YR |                                |            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING

8760 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY

5448 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

3312 HR/YR

HRS SAVED (HTG ONLY)

5448

1784

=

3664 HR/YR

HRS SAVED (CLG ONLY)

3312

1084

=

2228 HR/YR

|           |   |   |               |           |                     |
|-----------|---|---|---------------|-----------|---------------------|
| HOAUHC    | 293.33 MBtu   | - | 0 MBtu        | =         | 0.00E+00 Btu/CFM-HR |
|           | 860 CFM   | x | 5892 HR/YR    |           |                     |
| HOAUH     | 293.33 MBtu   | - | 0 MBtu        | =         | 0.00E+00 Btu/CFM-HR |
|           | 860 CFM   | x | 3664 HR/YR    |           |                     |
| COAUHC    | 133,272.8 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 860 CFM   | x | 5892 HR/YR    |           |                     |
| COAUC     | 133,272.8 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 860 CFM   | x | 2228 HR/YR    |           |                     |
| HOAOHC    | 293.33 MBtu   | - | 0 MBtu        | =         | 0.00E+00 Btu/CFM-HR |
|           | 860 CFM   | x | 2868 HR/YR    |           |                     |
| HOAOH     | 293.33 MBtu   | - | 0 MBtu        | =         | 0.00E+00 Btu/CFM-HR |
|           | 860 CFM   | x | 1784 HR/YR    |           |                     |
| COAOHC    | 133,272.8 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 860 CFM   | x | 2868 HR/YR    |           |                     |
| COAOC     | 133,272.8 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 860 CFM   | x | 1084 HR/YR    |           |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | =         | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | =         | 0.17                |
| ECC       | 123,082.3 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 9800 CFM  | x | 1084 HR/YR    |           |                     |
| ECHC      | 123,082.3 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 9800 CFM  | x | 2868 HR/YR    |           |                     |
| NSUCHC    | 133,272.8 kWH   | - | 123,082.3 kWH | =         | 1.76E-04 kWH/CFM-HR |
|           | 9800 CFM  | x | 5892 HR/YR    |           |                     |
| NSUCC     | 133,272.8 kWH   | - | 123,082.3 kWH | =         | 4.67E-04 kWH/CFM-HR |
|           | 9800 CFM  | x | 2228 HR/YR    |           |                     |
| DDCCHC    | 133,272.8 kWH   | - | 130,152.4 kWH | =         | 1.11E-04 kWH/CFM-HR |
|           | 9800 CFM  | x | 2868 HR/YR    |           |                     |
| DDCCC     | 133,272.8 kWH   | - | 130,152.4 kWH | =         | 2.94E-04 kWH/CFM-HR |
|           | 9800 CFM  | x | 1084 HR/YR    |           |                     |
| NSC       | 293.33 MBtu   | - | 150.61 MBtu   | =         | 1.09E+05 Btu/UA     |
|           | 1307.5584 UA  |   |               |           |                     |
| DDCH      | 293.33 MBtu   | - | 250.85 MBtu   | =         | 3.25E+04 Btu/UA     |
|           | 1307.5584 UA  |   |               |           |                     |
| OPT       | (2 HR/DAY X 240 DAY/YR)                               |   |               | 175 HR/YR |                     |
|           |   |   |               | =         | 305 HR/YR           |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               |           |                     |
|           |   |   |               | =         | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01          | =         | 5.67 HR/YR          |



INPUT LOADS ..

```

$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BLDG. #7450      *
        LINE-5 *REGIMENTAL HQ BLDG                      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
LOADS-REPORT VERIFICATION=(LV-D)
            SUMMARY=(LS-C,LS-D)
            HOURLY-DATA-SAVE = YES ..

BUILDING-LOCATION  LATITUDE = 39.0
                  LONGITUDE = 96.5
                  ALTITUDE = 1065.
                  TIME-ZONE = 6
                  GROSS-AREA = 9600
                  SHIELDING-COEF = 0.29
                  X-REF = 0.0
                  Y-REF = 0.0 ..

RUN-PERIOD      JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

```

LD_ON      =DAY-SCHEDULE  (1,24) (1.) ..

LD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..

LD_PEOPLE  =DAY-SCHEDULE  (1,5) (0.)
                  (6,11) (1.)
                  (12) (0.5)
                  (13,17) (1.)
                  (18,24) (0.) ..

LD_LIT/EQP =DAY-SCHEDULE  (1,5) (0.1)
                  (6,17) (1.)
                  (18) (0.5)
                  (19,24) (0.1) ..

LW_ON      =WEEK-SCHEDULE  (ALL) LD_ON ..

LW_OFF     =WEEK-SCHEDULE  (ALL) LD_OFF ..

LW_PEOPLE  =WEEK-SCHEDULE  (WD) LD_PEOPLE

```

(WEH) LD\_OFF ..

LW\_LIT/EQP =WEEK-SCHEDULE (WD) LD\_LIT/EQP  
(WEH) LD\_OFF ..

\$ ON 100% LOADS

L\_ON =SCHEDULE THRU DEC 31 LW\_ON ..

\$ OFF 100% LOADS

L\_OFF =SCHEDULE THRU DEC 31 LW\_OFF ..

\$ PEOPLE LOAD

L\_PEOPLE =SCHEDULE THRU DEC 31 LW\_PEOPLE ..

\$ LIGHTS AND EQUIPMENT

L\_EQUI/LIG =SCHEDULE THRU DEC 31 LW\_LIT/EQP ..

#### \$ CONSTRUCTION TYPES

\$ U-VAL FROM PLANS + I-F-R = .61

WALL =CONSTRUCTION U-VALUE = 0.094  
ABSORPTANCE = 0.880  
ROUGHNESS = 2 ..

\$ SLAB FLOOR

FLOOR =CONSTRUCTION U-VALUE = 0.020  
ABSORPTANCE = 0.610  
ROUGHNESS = 5 ..

\$ STANDARD METAL DOOR

DOOR-MET =CONSTRUCTION U-VALUE = 0.480  
ABSORPTANCE = 0.860  
ROUGHNESS = 5 ..

\$ U-VAL FROM PLANS ROOF+I-F-R =.68

BLT-ROOF =CONSTRUCTION U-VALUE = 0.048  
ABSORPTANCE = 0.880  
ROUGHNESS = 1 ..

INS-PANE =CONSTRUCTION U-VALUE = 0.220  
ABSORPTANCE = 0.820  
ROUGHNESS = 2 ..

2PN-INS =GLASS-TYPE GLASS-TYPE-CODE = 4  
PANES = 2 ..

GLS-DOOR =GLASS-TYPE GLASS-TYPE-CODE = 3  
PANES = 1 ..

## \$ SPACE DESCRIPTION

FRONT-SPAC =SPACE AREA = 1200.0 VOLUME = 34800.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 100.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 6.0  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_EQUI/LIG  
 EQUIP-SCHEDULE = L\_EQUI/LIG EQUIPMENT-W/SQFT = 2.48  
 FURN-WEIGHT = 0.8 INF-METHOD = NONE ..

E-W HEIGHT = 27.0 WIDTH = 57.0 CONS = WALL  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 27.0 WIDTH = 16.8 CONS = WALL  
 AZIMUTH = 45 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 27.0 WIDTH = 16.8 CONS = WALL  
 AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 27.0 WIDTH = 24.0 CONS = INS-PANE  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 5.3 WIDTH = 2.0 G-T = 2PN-INS  
 MULTIPLIER = 18.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 8.0 WIDTH = 11.0 G-T = GLS-DOOR  
 SETBACK = 0.5 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 OVERHANG-A = 1.  
 OVERHANG-W = 14. OVERHANG-D = 6.5 ..

WINDOW HEIGHT = 9.0 WIDTH = 11.0 G-T = 2PN-INS  
 SETBACK = 0.5 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 27.0 WIDTH = 4.0 CONS = INS-PANE  
 AZIMUTH = 45 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 5.3 WIDTH = 2.0 G-T = 2PN-INS  
 MULTIPLIER = 6.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 27.0 WIDTH = 4.0 CONS = INS-PANE  
 AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 5.3 WIDTH = 2.0 G-T = 2PN-INS  
 MULTIPLIER = 6.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 20.0 WIDTH = 75.0 CONS = FLOOR ..

ROOF HEIGHT = 30.0 WIDTH = 40.0 CONS = BLT-ROOF  
TILT = 0 INSIDE-VIS-REFL = 0.2 ..

BACK-SPACE =SPACE AREA = 1200.0 VOLUME = 34800.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 100.0  
PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 6.0  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_EQUI/LIG  
EQUIP-SCHEDULE = L\_EQUI/LIG EQUIPMENT-W/SQFT = 2.48  
FURN-WEIGHT = 0.8 INF-METHOD = NONE ..

E-W HEIGHT = 27.0 WIDTH = 65.0 CONS = WALL  
AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 3.0 WIDTH = 1.5 G-T = GLS-DOOR  
MULTIPLIER = 4.0 SETBACK = 0.5  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
OVERHANG-A = 1. OVERHANG-W = 14. OVERHANG-D = 6.5 ..

DOOR HEIGHT = 13.0 WIDTH = 1.0 CONS = DOOR-MET  
MULTIPLIER = 4.0 SETBACK = 0.5  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 27.0 WIDTH = 16.8 CONS = WALL  
AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ...

E-W HEIGHT = 27.0 WIDTH = 16.8 CONS = WALL  
AZIMUTH = 45 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 27.0 WIDTH = 16.0 CONS = INS-PANE  
AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 6.0 WIDTH = 2.0 G-T = 2PN-INS  
MULTIPLIER = 16.0 SETBACK = 0.5  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 27.0 WIDTH = 4.0 CONS = INS-PANE  
AZIMUTH = 45 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 5.3 WIDTH = 2.0 G-T = 2PN-INS  
MULTIPLIER = 6.0 SETBACK = 0.5  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 27.0 WIDTH = 4.0 CONS = INS-PANE

AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 6.0 WIDTH = 2.0 G-T = 2PN-INS  
MULTIPLIER = 4.0 SETBACK = 0.5  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 20.0 WIDTH = 75.0 CONS = FLOOR ..

ROOF HEIGHT = 30.0 WIDTH = 40.0 CONS = BLT-ROOF  
TILT = 0 INSIDE-VIS-REFL = 0.2 ..

CORE-ZONE =SPACE AREA = 800.0 VOLUME = 23200.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 100.0  
PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 6.0  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_EQUI/LIG  
EQUIP-SCHEDULE = L\_EQUI/LIG EQUIPMENT-W/SQFT = 2.48  
FURN-WEIGHT = 0.8 INF-METHOD = NONE ..

ROOF HEIGHT = 20.0 WIDTH = 40.0 CONS = BLT-ROOF  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

U-W HEIGHT = 20.0 WIDTH = 40.0 CONS = FLOOR ..

END ..  
COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
\$ E Z - D O E S Y S T E M S I N P U T \$  
\$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*  
  
LINE-4 \*BASELINE SIMULATION FOR BLDG. #7450 \*  
LINE-5 \*REGIMENTAL HQ BLDG \* ..  
  
ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
SYSTEMS-REPORT VERIFICATION=(SV-A)  
SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

SD\_WT\_HT =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,24) (76.) ..  
 SD\_SM\_HT =DAY-SCHEDULE (1,24) (70.) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..

SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..

SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..

# \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

# \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

# \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

# \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

# \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

# \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

HRLY-RPT =SCHEDULE THRU JAN 12 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU AUG 20 SW\_OFF  
 THRU AUG 23 SW\_ON  
 THRU DEC 31 SW\_OFF ..

# \$ ZONE DESCRIPTION

FRONT-SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F



ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 3950.  
 SIZING-OPTION = FROM-LOADS ..

BACK-SPACE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 4650.  
 SIZING-OPTION = FROM-LOADS ..

CORE-ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 825.  
 OUTSIDE-AIR-CFM = 825. SIZING-OPTION = FROM-LOADS ..

#### \$ SYSTEM DESCRIPTION

FRESH-AIR =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED SUPPLY-CFM = 825.  
 RATED-CFM = 825. MIN-OUTSIDE-AIR = 1.0  
 SUPPLY-DELTA-T = 1.8 SUPPLY-KW = 0.00059  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 COOLING-CAPACITY = 55000. COOL-SH-CAP = 44000.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -63260.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER SIZING-OPTION = COINCIDENT  
 REFG-FAN-KW = 0.1 REFG-PUMP-KW = 0.0  
 ZONE-NAMES = (CORE-ZONE) ..

FC'S-ZN-#1 =SYSTEM SYSTEM-TYPE = TPFC  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED RATED-CFM = 3950.  
 MIN-AIR-SCH = S\_OFF SUPPLY-DELTA-T = 0.2  
 SUPPLY-KW = 0.00007 NIGHT-CYCLE-CTRL = STAY-OFF  
 COOLING-CAPACITY = 116400. COOL-SH-CAP = 86200.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -414000.  
 ZONE-NAMES = (FRONT-SPAC) ..

FC'S-ZN-#2 =SYSTEM SYSTEM-TYPE = TPFC  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED RATED-CFM = 4650.  
 MIN-AIR-SCH = S\_OFF SUPPLY-DELTA-T = 0.2  
 SUPPLY-KW = 0.00007 NIGHT-CYCLE-CTRL = STAY-OFF  
 COOLING-CAPACITY = 134300. COOL-SH-CAP = 98700.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -488000.  
 ZONE-NAMES = (BACK-SPACE) ..

#### \$ HOURLY REPORT DESCRIPTION

```

AHU-BLK  =REPORT-BLOCK VARIABLE-TYPE = FRESH-AIR
          VARIABLE-LIST = (3,5,6,17) ..
FANCL-BLOK =REPORT-BLOCK VARIABLE-TYPE = FC'S-ZN-#2
          VARIABLE-LIST = (3,5,6,17) ..
PERI-BLK  =REPORT-BLOCK VARIABLE-TYPE = FRONT-SPAC
          VARIABLE-LIST = (17,18,7,6) ..
CORE-BLK  =REPORT-BLOCK VARIABLE-TYPE = CORE-ZONE
          VARIABLE-LIST = (17,18,7,6) ..
AHUS-RPT  = HOURLY-REPORT REPORT-SCHEDULE = HRLY-RPT
          REPORT-BLOCK = (AHU-BLK,FANCL-BLOK)
..
ZONE-BLK  = HOURLY-REPORT REPORT-SCHEDULE = HRLY-RPT
          REPORT-BLOCK = (PERI-BLK,CORE-BLK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BLDG. #7450      *
        LINE-5 *REGIMENTAL HQ BLDG                      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC WARNINGS ..
PLANT-REPORT VERIFICATION=(PV-A)
            SUMMARY=(PS-B,BEPS)
            HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON      =DAY-SCHEDULE (1,24) (1.) ..
PD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

PW_OFF     =WEEK-SCHEDULE (ALL) PD_OFF ..
PW_ON      =WEEK-SCHEDULE (ALL) PD_ON  ..

```

## \$ HEATING SEASON

```

P_HEAT     =SCHEDULE THRU MAY 15 PW_ON
            THRU OCT  1 PW_OFF
            THRU DEC 31 PW_ON  ..

```

## \$ COOLING SEASON

P\_COOL =SCHEDULE THRU MAY 15 PW\_OFF  
THRU OCT 1 PW\_ON  
THRU DEC 31 PW\_OFF ..

## \$ EQUIPMENT DESCRIPTION

BOIL-HW =PLANT-EQUIPMENT TYPE = HW-BOILER  
SIZE = -999. ..

HER-REC-CH =PLANT-EQUIPMENT TYPE = HERM-REC-CHLR  
SIZE = -999. INSTALLED-NUMBER = 2  
MAX-NUMBER-AVAIL = 2 ..

PLANT-PARAMETERS BOILER-FUEL = NATURAL-GAS HERM-REC-COND-TYPE = AIR  
CCIRC-HEAD = 85.0 HCIRC-HEAD = 85.0 ..

ENERGY-RESOURCE RESOURCE = ELECTRICITY ..  
ENERGY-RESOURCE RESOURCE = NATURAL-GAS ..

P-HEAT-SEA =LOAD-ASSIGNMENT TYPE = HEATING  
OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = BOIL-HW  
NUMBER = 1 ..

P-COOL-SEA =LOAD-ASSIGNMENT TYPE = COOLING  
OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = HER-REC-CH  
NUMBER = 2 ..

END ..  
COMPUTE PLANT ..  
STOP ..

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOB-2.1D 5/16/1995 8:25:23 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

NUMBER OF EXTERIOR SURFACES 15 RECTANGULAR 15 OTHER 0  
 (U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED )

| SURFACE    | SPACE | U-VALUE<br>(BTU/HR-SQFT-F) | GLASS AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | WALLS AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | GLASS AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | WALLS AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) | AZIMUTH    |
|------------|-------|----------------------------|----------------------|----------------------------|----------------------|----------------------------|----------------------|----------------------------|----------------------|--------------------------------|------------|
| FRONT-SPAC |       | 0.000                      | 0.00                 | 0.092                      | 0.00                 | 0.092                      | 453.60               | 0.092                      | 453.60               | 453.60                         | NORTH-EAST |
| FRONT-SPAC |       | 0.490                      | 63.60                | 0.210                      | 63.60                | 0.375                      | 44.40                | 0.375                      | 108.00               | 108.00                         | NORTH-EAST |
| BACK-SPACE |       | 0.000                      | 0.00                 | 0.092                      | 0.00                 | 0.092                      | 453.60               | 0.092                      | 453.60               | 453.60                         | NORTH-EAST |
| BACK-SPACE |       | 0.490                      | 63.60                | 0.210                      | 63.60                | 0.375                      | 44.40                | 0.375                      | 108.00               | 108.00                         | NORTH-EAST |
| FRONT-SPAC |       | 0.614                      | 377.80               | 0.210                      | 0.00                 | 0.445                      | 270.20               | 0.445                      | 648.00               | 648.00                         | SOUTH-EAST |
| FRONT-SPAC |       | 0.000                      | 0.00                 | 0.092                      | 0.00                 | 0.092                      | 1539.00              | 0.092                      | 1539.00              | 1539.00                        | SOUTH-EAST |
| BACK-SPACE |       | 0.000                      | 0.00                 | 0.092                      | 0.00                 | 0.092                      | 453.60               | 0.092                      | 453.60               | 453.60                         | SOUTH-WEST |
| FRONT-SPAC |       | 0.000                      | 0.00                 | 0.092                      | 0.00                 | 0.092                      | 453.60               | 0.092                      | 453.60               | 453.60                         | SOUTH-WEST |
| FRONT-SPAC |       | 0.490                      | 63.60                | 0.210                      | 63.60                | 0.375                      | 44.40                | 0.375                      | 108.00               | 108.00                         | SOUTH-WEST |
| BACK-SPACE |       | 0.490                      | 48.00                | 0.210                      | 48.00                | 0.334                      | 60.00                | 0.334                      | 1737.00              | 1737.00                        | SOUTH-WEST |
| BACK-SPACE |       | 1.021                      | 18.00                | 0.092                      | 18.00                | 0.102                      | 240.00               | 0.102                      | 1755.00              | 1755.00                        | NORTH-WEST |
| FRONT-SPAC |       | 0.490                      | 192.00               | 0.210                      | 0.00                 | 0.334                      | 1200.00              | 0.334                      | 432.00               | 432.00                         | ROOF       |
| BACK-SPACE |       | 0.000                      | 0.00                 | 0.048                      | 0.00                 | 0.048                      | 1200.00              | 0.048                      | 1200.00              | 1200.00                        | ROOF       |
| BACK-SPACE |       | 0.000                      | 0.00                 | 0.048                      | 0.00                 | 0.048                      | 800.00               | 0.048                      | 800.00               | 800.00                         | ROOF       |
| CORE-ZONE  |       | 0.000                      | 0.00                 | 0.048                      | 0.00                 | 0.048                      | 1500.00              | 0.048                      | 1500.00              | 1500.00                        | UNDERGRND  |
| FRONT-SPAC |       | 0.000                      | 0.00                 | 0.020                      | 0.00                 | 0.020                      | 1500.00              | 0.020                      | 1500.00              | 1500.00                        | UNDERGRND  |
| BACK-SPACE |       | 0.000                      | 0.00                 | 0.020                      | 0.00                 | 0.020                      | 800.00               | 0.020                      | 800.00               | 800.00                         | UNDERGRND  |
| CORE-ZONE  |       | 0.000                      | 0.00                 | 0.020                      | 0.00                 | 0.020                      | 800.00               | 0.020                      | 800.00               | 800.00                         | UNDERGRND  |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOB-2.1D 5/16/1995 8:25:23 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

|             | AVERAGE<br>U-VALUE/GLASS<br>(BTU/HR-SQFT-F) | AVERAGE<br>U-VALUE/WALLS<br>(BTU/HR-SQFT-F) | AVERAGE U-VALUE<br>WALLS+GLASS<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | OPAQUE<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) |
|-------------|---|---|---|-------------------------|--------------------------|--------------------------------|
| NORTH-EAST  | 0.490                                       | 0.103                                       | 0.147   | 127.20                  | 996.00                   | 1123.20                        |
| SOUTH-EAST  | 0.614                                       | 0.110                                       | 0.197   | 377.80                  | 1809.20                  | 2187.00                        |
| SOUTH-WEST  | 0.490                                       | 0.104                                       | 0.143   | 111.60                  | 1011.60                  | 1123.20                        |
| NORTH-WEST  | 0.536                                       | 0.106                                       | 0.148   | 210.00                  | 1977.00                  | 2187.00                        |
| ROOF        | 0.000                                       | 0.048                                       | 0.048   | 0.00                    | 3200.00                  | 3200.00                        |
| ALL WALLS   | 0.558                                       | 0.106                                       | 0.163   | 826.60                  | 5793.80                  | 6620.40                        |
| WALLS+ROOFS | 0.558                                       | 0.086                                       | 0.125   | 826.60                  | 8993.80                  | 9820.40                        |
| UNDERGRND   | 0.000                                       | 0.020                                       | 0.020   | 0.00                    | 3800.00                  | 3800.00                        |
| BUILDING    | 0.558                                       | 0.066                                       | 0.096   | 826.60                  | 12793.80                 | 13620.40                       |

\*\*\* BUILDING \*\*\*

|            |       |      |      |      |
|------------|-------|------|------|------|
| FLOOR AREA | 3200  | SQFT | 297  | SQMT |
| VOLUME     | 92800 | CUFT | 2628 | CUMT |

|               |              |              |
|---------------|--------------|--------------|
| TIME          | COOLING LOAD | HEATING LOAD |
| DRY-BULB TEMP | MAY 31 5PM   | JAN 15 8AM   |
| WET-BULB TEMP | 90F 32C      | -6F -21C     |
|               | 75F 24C      | -7F -22C     |

|                      | SENSIBLE<br>(KBTU/H) | ( KW )     | LATENT<br>(KBTU/H) | ( KW )  |  | SENSIBLE<br>(KBTU/H) | ( KW )     |
|----------------------|----------------------|------------|--------------------|---------|--|----------------------|------------|
| WALLS                | 23.103               | 6.766      | 0.000              | 0.000   |  | -49.553              | -14.513    |
| ROOFS                | 11.839               | 3.467      | 0.000              | 0.000   |  | -12.618              | -3.695     |
| GLASS CONDUCTION     | 6.754                | 1.978      | 0.000              | 0.000   |  | -35.746              | -10.469    |
| GLASS SOLAR          | 26.904               | 7.880      | 0.000              | 0.000   |  | 1.299                | 0.380      |
| DOOR                 | 0.961                | 0.281      | 0.000              | 0.000   |  | -2.641               | -0.774     |
| INTERNAL SURFACES    | 0.000                | 0.000      | 0.000              | 0.000   |  | 0.000                | 0.000      |
| UNDERGROUND SURFACES | -1.779               | -0.521     | 0.000              | 0.000   |  | -2.182               | -0.639     |
| OCCUPANTS TO SPACE   | 11.030               | 3.230      | 20.000             | 5.857   |  | 0.440                | 0.129      |
| LIGHT TO SPACE       | 59.157               | 17.326     | 0.000              | 0.000   |  | 4.754                | 1.392      |
| EQUIPMENT TO SPACE   | 25.298               | 7.409      | 0.000              | 0.000   |  | 1.334                | 0.391      |
| PROCESS TO SPACE     | 0.000                | 0.000      | 0.000              | 0.000   |  | 0.000                | 0.000      |
| INFILTRATION         | 0.000                | 0.000      | 0.000              | 0.000   |  | 0.000                | 0.000      |
| TOTAL                | 163.266              | 47.817     | 20.000             | 5.857   |  | -94.913              | -27.798    |
| TOTAL LOAD           | 183.266              | KBTU/H     | 53.674             | KW      |  | -94.913              | KBTU/H     |
| TOTAL LOAD / AREA    | 57.27                | BTU/H.SQFT | 180.545            | W /SQMT |  | 29.660               | BTU/H.SQFT |
|                      |                      |            |                    |         |  |                      | W /SQMT    |

\*\*\*\*\*  
\* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR \*  
\* LOADS \*  
\* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION \*  
\* IN CONSIDERATION \*  
\*\*\*\*\*

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 8:25:23 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR FRESH-AIR TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                   |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -28.429                     | 15                      | 6                    | -8.F                 | -9.F                                    | 2303.                     | 7.368                           |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -21.520                     | 3                       | 7                    | -5.F                 | -6.F                                    | 2080.                     | 7.368                           |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -16.876                     | 4                       | 5                    | 14.F                 | 12.F                                    | 2483.                     | 7.268                           |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -6.469                      | 3                       | 1                    | 33.F                 | 32.F                                    | 2287.                     | 7.268                           |
| MAY   | 4.35980                     | 31 18                   | 90.F                 | 76.F                 | 57.444                                  | -1.782                      | 1                       | 6                    | 37.F                 | 37.F                                    | 2712.                     | 12.741                          |
| JUN   | 14.95887                    | 27 16                   | 89.F                 | 77.F                 | 62.585                                  | 0.000                       |                         |                      |                      | 0.000                                   | 3790.                     | 13.184                          |
| JUL   | 20.04893                    | 21 16                   | 89.F                 | 79.F                 | 68.010                                  | 0.000                       |                         |                      |                      | 0.000                                   | 4089.                     | 13.494                          |
| AUG   | 20.85109                    | 22 17                   | 95.F                 | 77.F                 | 63.675                                  | 0.000                       |                         |                      |                      | 0.000                                   | 4518.                     | 13.550                          |
| SEP   | 9.39246                     | 7 16                    | 93.F                 | 76.F                 | 60.206                                  | 0.000                       |                         |                      |                      | 0.000                                   | 3178.                     | 13.236                          |
| OCT   | 0.03419                     | 1 17                    | 85.F                 | 68.F                 | 9.316                                   | -6.053                      | 20                      | 5                    | 25.F                 | 25.F                                    | 2210.                     | 7.268                           |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -14.618                     | 3                       | 5                    | 13.F                 | 12.F                                    | 2195.                     | 7.268                           |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -25.319                     | 14                      | 22                   | 2.F                  | 1.F                                     | 2299.                     | 7.368                           |
| TOTAL | 69.645                      |                         |                      |                      |   | -121.066                    |                         |                      |                      |   | 34143.                    |                                 |
| TAX   |                             |                         |                      |                      | 68.010                                  |                             |                         |                      |                      | -71.786                                 |                           | 13.550                          |

H2-14

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 8:25:23 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- SS-C SYSTEM MONTHLY LOADS SUMMARY FOR FRESH-AIR TOPEKA, KS

| MONTH  | HOURS           |                 |                   |                    | NUMBER OF         |                            |                            |                           | HOURS                     |                                      |  |   | --COINCIDENT LOADS--                           |  |  |  |
|--------|-----------------|-----------------|-------------------|--------------------|-------------------|----------------------------|----------------------------|---------------------------|---------------------------|--------------------------------------|--|---|--|--|--|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | COINCIDENT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |  |  |
| JAN    | 0               | 730             | 0                 | 0                  | 14                | 744                        | 0                          | 0                         | 0                         | 14                                   | -35.001  | 1.165   | 1.165  |  |  |  |
| FEB    | 0               | 657             | 0                 | 0                  | 15                | 672                        | 0                          | 0                         | 0                         | 15                                   | -35.455  | 1.165   | 1.165  |  |  |  |
| MAR    | 0               | 650             | 0                 | 0                  | 94                | 744                        | 0                          | 0                         | 0                         | 94                                   | -34.738  | 1.165   | 1.165  |  |  |  |
| APR    | 0               | 409             | 0                 | 0                  | 311               | 720                        | 0                          | 0                         | 0                         | 311                                  | -22.945  | 0.487   | 0.487  |  |  |  |
| MAY    | 274             | 155             | 0                 | 0                  | 315               | 360                        | 279                        | 0                         | 0                         | 315                                  | 0.000  | 9.499   | 9.499  |  |  |  |
| JUN    | 641             | 0               | 0                 | 0                  | 79                | 0                          | 642                        | 0                         | 0                         | 79                                   | 0.000  | 13.184  | 13.184   |  |  |  |
| JUL    | 710             | 0               | 0                 | 0                  | 34                | 0                          | 713                        | 0                         | 0                         | 34                                   | 0.000  | 13.459  | 13.459   |  |  |  |
| AUG    | 727             | 0               | 0                 | 0                  | 17                | 0                          | 728                        | 0                         | 0                         | 17                                   | 0.000  | 13.525  | 13.525   |  |  |  |
| SEP    | 445             | 0               | 0                 | 0                  | 275               | 0                          | 454                        | 0                         | 0                         | 275                                  | 0.000  | 13.236  | 13.236   |  |  |  |
| OCT    | 5               | 422             | 0                 | 0                  | 317               | 720                        | 5                          | 0                         | 0                         | 317                                  | 0.000  | 1.529   | 1.529  |  |  |  |
| NOV    | 0               | 589             | 0                 | 0                  | 131               | 720                        | 0                          | 0                         | 0                         | 131                                  | -41.434  | 1.165   | 1.165  |  |  |  |
| DEC    | 0               | 722             | 0                 | 0                  | 22                | 744                        | 0                          | 0                         | 0                         | 22                                   | -45.030  | 0.487   | 0.487  |  |  |  |
| ANNUAL | 2802            | 4334            | 0                 | 0                  | 1624              | 5424                       | 2821                       | 0                         | 0                         | 1624                                 |  |   |  |  |  |  |

| EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 8:25:23 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |  |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|--|
| DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7450 REGIMENTAL HQ BLDG                        |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |  |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR FC'S-ZN-#1 TOPEKA, KS                            |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |  |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |  |
| JAN  | 0.00000                     |                         |                      |                      | -9.721                      | 15                      | -6.F                 | -7.F                 | -49.373                                 | 3111.                              | 10.448                          |  |
| FEB  | 0.00000                     |                         |                      |                      | -5.976                      | 3                       | -1.F                 | -2.F                 | -38.358                                 | 2814.                              | 10.448                          |  |
| MAR  | 0.00000                     |                         |                      |                      | -3.966                      | 14                      | 5                    | 16.F                 | -35.298                                 | 3387.                              | 10.448                          |  |
| APR  | 0.00000                     |                         |                      |                      | -1.243                      | 17                      | 7                    | 35.F                 | -15.599                                 | 3104.                              | 10.448                          |  |
| MAY  | 9.62606                     | 31                      | 17                   | 90.F                 | 75.F                        | 9                       | 5                    | 45.F                 | -7.997                                  | 3111.                              | 10.448                          |  |
| JUN  | 20.08339                    | 28                      | 17                   | 90.F                 | 76.F                        |                         |                      |                      | 0.000                                   | 3242.                              | 10.448                          |  |
| JUL  | 20.98320                    | 13                      | 17                   | 92.F                 | 78.F                        |                         |                      |                      | 0.000                                   | 2972.                              | 10.448                          |  |
| AUG  | 22.92898                    | 11                      | 16                   | 100.F                | 71.F                        |                         |                      |                      | 0.000                                   | 3387.                              | 10.448                          |  |
| SEP  | 16.07776                    | 7                       | 17                   | 92.F                 | 75.F                        |                         |                      |                      | 0.000                                   | 3104.                              | 10.448                          |  |
| OCT  | 0.20464                     | 1                       | 17                   | 85.F                 | 68.F                        | 30                      | 24                   | 46.F                 | -17.484                                 | 2972.                              | 10.448                          |  |
| NOV  | 0.00000                     |                         |                      |                      | -3.799                      | 12                      | 6                    | 19.F                 | -32.281                                 | 2966.                              | 10.448                          |  |
| DEC  | 0.00000                     |                         |                      |                      | -8.742                      | 12                      | 5                    | 4.F                  | -43.583                                 | 3111.                              | 10.448                          |  |
| TOTAL  | 89.904                      |                         |                      |                      | -35.609                     |                         |                      |                      | -49.373                                 | 37285.                             | 10.448                          |  |
| MAX  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |  |

| EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 8:25:23 SDL RUN 1 |         |         |            |         |         |         |         |         |         |                      |          |
|--|---------|---------|------------|---------|---------|---------|---------|---------|---------|----------------------|----------|
| DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7450 REGIMENTAL HQ BLDG                        |         |         |            |         |         |         |         |         |         |                      |          |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR FC'S-ZN-#1 TOPEKA, KS                               |         |         |            |         |         |         |         |         |         |                      |          |
|  | HOURS   |         |            | HOURS   |         |         | HOURS   |         |         | --COINCIDENT LOADS-- |          |
|  | COOLING | HEATING | COINCIDENT | HEATING | COOLING | HEATING | COOLING | HEATING | COOLING | HEATING              | ELECTRIC |
| MONTH  | LOAD    | LOAD    | LOAD       | AVAIL.  | AVAIL.  | FANS ON | FANS ON | VENTING | WHEN    | PEAK                 | LOAD AT  |
|  |         |         |            |         |         |         |         |         | FANS ON | (KW)                 | COOLING  |
|  |         |         |            |         |         |         |         |         |         |                      | PEAK     |
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| EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 8:25:23 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                      |
|---|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|----------------------|
| DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7450 REGIMENTAL HQ BLDG                             |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                      |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR FC'S-ZN-#2 TOPEKA, KS                                 |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                      |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----   |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                      |
| MONTH   | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -10.180                     | 15                      | -6.F                 | -7.F                 | -43.423                                 | 3147.                     | 10.497               |
| FEB   | 0.00000                     |                         |                      |                      | -6.667                      | 3                       | -1.F                 | -2.F                 | -34.673                                 | 2847.                     | 10.497               |
| MAR   | 0.00000                     |                         |                      |                      | -4.198                      | 6                       | 7                    | 18.F                 | -31.775                                 | 3424.                     | 10.497               |
| APR   | 0.00000                     |                         |                      |                      | -1.416                      | 4                       | 5                    | 33.F                 | -17.536                                 | 3139.                     | 10.497               |
| MAY   | 8.71709                     | 31                      | 17                   | 90.F                 | 75.F                        | 9                       | 5                    | 45.F                 | -7.756                                  | 3147.                     | 10.497               |
| JUN   | 18.35137                    | 27                      | 17                   | 89.F                 | 77.F                        |                         |                      |                      | 0.000                                   | 3278.                     | 10.497               |
| JUL   | 19.34946                    | 7                       | 17                   | 83.F                 | 73.F                        |                         |                      |                      | 0.000                                   | 3009.                     | 10.497               |
| AUG   | 20.47105                    | 4                       | 17                   | 92.F                 | 70.F                        |                         |                      |                      | 0.000                                   | 3424.                     | 10.497               |
| SEP   | 13.65467                    | 7                       | 17                   | 92.F                 | 75.F                        |                         |                      |                      | 0.000                                   | 3139.                     | 10.497               |
| OCT   | 0.07060                     | 1                       | 18                   | 83.F                 | 68.F                        | 2                       | 6                    | 53.F                 | -15.650                                 | 3009.                     | 10.497               |
| NOV   | 0.00000                     |                         |                      |                      | -4.457                      | 12                      | 6                    | 19.F                 | -30.260                                 | 3001.                     | 10.497               |
| DEC   | 0.00000                     |                         |                      |                      | -8.453                      | 12                      | 5                    | 4.F                  | -37.248                                 | 3147.                     | 10.497               |
| TOTAL   | 80.614                      |                         |                      |                      | -37.687                     |                         |                      |                      | -43.423                                 | 37712.                    | 10.497               |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                      |

H2-16

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 8:25:23 SDL RUN 1 |                          |                          |  |                            |                            |                  |                           |                           |                                      |  |  |
|---|--------------------------|--------------------------|--|----------------------------|----------------------------|------------------|---------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7450 REGIMENTAL HQ BLDG                       |                          |                          |  |                            |                            |                  |                           |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR FC'S-ZN-#2 TOPEKA, KS                              |                          |                          |  |                            |                            |                  |                           |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----   |                          |                          |  |                            |                            |                  |                           |                           |                                      |  |  |
| MONTH   | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON | HOURS<br>FANS<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | --COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN   | 0                        | 566                      | 0  | 744                        | 0                          | 744              | 0                         | 0                         | 178                                  | -5.619   | 1.343  |
| FEB   | 0                        | 472                      | 0  | 672                        | 0                          | 672              | 0                         | 0                         | 200                                  | -3.034   | 1.343  |
| MAR   | 0                        | 468                      | 0  | 744                        | 0                          | 744              | 0                         | 0                         | 276                                  | -2.924   | 1.343  |
| APR   | 0                        | 395                      | 0  | 720                        | 0                          | 720              | 0                         | 0                         | 325                                  | -3.432   | 0.326  |
| MAY   | 371                      | 200                      | 0  | 360                        | 384                        | 744              | 0                         | 0                         | 173                                  | 0.000  | 10.497   |
| JUN   | 703                      | 0                        | 0  | 0                          | 720                        | 720              | 0                         | 0                         | 17                                   | 0.000  | 10.497   |
| JUL   | 744                      | 0                        | 0  | 0                          | 744                        | 744              | 0                         | 0                         | 0                                    | 0.000  | 10.497   |
| AUG   | 744                      | 0                        | 0  | 0                          | 744                        | 744              | 0                         | 0                         | 0                                    | 0.000  | 10.497   |
| SEP   | 618                      | 0                        | 0  | 0                          | 720                        | 720              | 0                         | 0                         | 102                                  | 0.000  | 10.497   |
| OCT   | 13                       | 424                      | 0  | 720                        | 24                         | 744              | 0                         | 0                         | 307                                  | 0.000  | 0.326  |
| NOV   | 0                        | 486                      | 0  | 720                        | 0                          | 720              | 0                         | 0                         | 234                                  | -9.988   | 1.343  |
| DEC   | 0                        | 543                      | 0  | 744                        | 0                          | 744              | 0                         | 0                         | 201                                  | -27.439  | 0.326  |
| ANNUAL  | 3193                     | 3554                     | 0  | 5424                       | 3336                       | 8760             | 0                         | 0                         | 2013                                 |  |  |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 8:25:23 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>32.182<br>101.160<br>28/ 9 | NATURAL-GAS<br>69.221<br>205.948<br>15/ 6 |
|-----|--|---|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 28.969<br>101.160<br>3/ 8                 | 50.999<br>177.708<br>3/ 5                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.963<br>100.818<br>21/ 6                | 38.721<br>161.816<br>14/ 5                |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 30.392<br>99.509<br>4/ 6                  | 15.504<br>102.324<br>4/ 5                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 38.115<br>161.117<br>31/17                | 5.129<br>68.863<br>1/ 6                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 49.935<br>160.088<br>27/17                | 0.000<br>0.000<br>30/ 1                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 50.193<br>163.456<br>22/16                | 0.000<br>0.000<br>31/ 1                   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 55.793<br>164.876<br>23/16                | 0.000<br>0.000<br>31/ 1                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 43.806<br>161.886<br>7/16                 | 0.000<br>0.000<br>30/ 1                   |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 29.427<br>100.145<br>20/ 7                | 15.898<br>89.070<br>30/24                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 29.956<br>100.818<br>28/ 6                | 35.556<br>155.907<br>12/ 6                |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 32.105<br>101.160<br>13/ 8                | 62.304<br>184.967<br>12/ 5                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |   |   |
|     | ONE YEAR<br>USE/PEAK                             | 454.836<br>164.876                        | 293.332<br>205.948                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 8:25:23 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 11.68       | 293.33      |
| SPACE COOL      | 82.19       | 0.00        |
| HVAC AUX        | 43.56       | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 224.60      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 92.83       | 0.00        |
| TOTAL           | 454.86      | 293.33      |

TOTAL SITE ENERGY 748.17 MBTU 77.9 KBTU/SQFT-YR GROSS-AREA 233.8 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1659.21 MBTU 172.8 KBTU/SQFT-YR GROSS-AREA 518.5 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 12.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 6.0 WIDTH = 2.0 G-T = 2PN-INS  
MULTIPLIER = 4.0 SETBACK = 0.5  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 20.0 WIDTH = 75.0 CONS = FLOOR ..

ROOF HEIGHT = 30.0 WIDTH = 40.0 CONS = BLT-ROOF  
TILT = 0 INSIDE-VIS-REFL = 0.2 ..

CORE-ZONE =SPACE AREA = 800.0 VOLUME = 23200.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 100.0  
PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 6.0  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_EQUI/LIG  
EQUIP-SCHEDULE = L\_EQUI/LIG EQUIPMENT-W/SQFT = 2.48  
FURN-WEIGHT = 0.8 INF-METHOD = NONE ..

ROOF HEIGHT = 20.0 WIDTH = 40.0 CONS = BLT-ROOF  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

U-W HEIGHT = 20.0 WIDTH = 40.0 CONS = FLOOR ..

END ..  
COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
\$ E Z - D O E S Y S T E M S I N P U T \$  
\$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #1 NIGHT SETBACK FOR BLDG. #7450 \*  
LINE-5 \*REGIMENTAL HQ BLDG \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
SYSTEMS-REPORT VERIFICATION=(SV-A)  
SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

```

SD_WT_HT   =DAY-SCHEDULE (1,5) (55.)
              (6,18) (74.)
              (19,24) (55.) ..
SD_SM_CL   =DAY-SCHEDULE (1,5) (85.)
              (6,18) (72.)
              (19,24) (85.) ..
SD_WT_CL   =DAY-SCHEDULE (1,5) (57.)
              (6,18) (76.)
              (19,24) (57.) ..
SD_SM_HT   =DAY-SCHEDULE (1,5) (83.)
              (6,18) (70.)
              (19,24) (83.) ..
SD_WT_HT_D =DAY-SCHEDULE (1,24) (55.) ..
SD_SM_CL_D =DAY-SCHEDULE (1,24) (85.) ..
SD_WT_CL_D =DAY-SCHEDULE (1,24) (57.) ..
SD_SM_HT_D =DAY-SCHEDULE (1,24) (83.) ..
SD_FAN_CYC =DAY-SCHEDULE (1,5) (0.)
              (6,18) (1.)
              (19,24) (0.) ..

```



```

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..
SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..
SW_WT_HT   =WEEK-SCHEDULE (WD) SD_WT_HT
              (WEH) SD_WT_HT_D ..
SW_SM_CL   =WEEK-SCHEDULE (WD) SD_SM_CL
              (WEH) SD_SM_CL_D ..
SW_WT_CL   =WEEK-SCHEDULE (WD) SD_WT_CL
              (WEH) SD_WT_CL_D ..
SW_SM_HT   =WEEK-SCHEDULE (WD) SD_SM_HT
              (WEH) SD_SM_HT_D ..
SW_FAN_CYC =WEEK-SCHEDULE (WD) SD_FAN_CYC
              (WEH) SD_OFF ..

```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..
```

## \$ HEATING SEASON

```

S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT 1 SW_OFF
              THRU DEC 31 SW_ON ..

```

## \$ COOLING SEASON

```

S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT 1 SW_ON
              THRU DEC 31 SW_OFF ..

```

## \$ HEATING SET TEMP

S\_HT\_SET\_F = SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F = SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

HRLY-RPT = SCHEDULE THRU JAN 12 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU AUG 20 SW\_OFF  
 THRU AUG 23 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYCL = SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

## \$ ZONE DESCRIPTION

FRONT-SPAC = ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 3950.  
 SIZING-OPTION = FROM-LOADS ..

BACK-SPACE = ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 4650.  
 SIZING-OPTION = FROM-LOADS ..

CORE-ZONE = ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 825.  
 OUTSIDE-AIR-CFM = 825. SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

FRESH-AIR = SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED SUPPLY-CFM = 825.  
 RATED-CFM = 825. MIN-OUTSIDE-AIR = 1.0  
 FAN-SCHEDULE = S\_FAN\_CYCL SUPPLY-DELTA-T = 1.8  
 SUPPLY-KW = 0.00059  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY NIGHT-VENT-DT = 0.0  
 COOLING-CAPACITY = 55000. COOL-SH-CAP = 44000.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -63260.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER SIZING-OPTION = COINCIDENT

REFG-FAN-KW = 0.1 REFG-PUMP-KW = 0.0  
 ZONE-NAMES = (CORE-ZONE) ..

FC'S-ZN-#1 =SYSTEM SYSTEM-TYPE = TPFC  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HT\_SET\_F  
 COOLING-SCHEDULE = S\_CL\_SCHED RATED-CFM = 3950.  
 MIN-AIR-SCH = S\_OFF FAN-SCHEDULE = S\_FAN\_CYCL  
 SUPPLY-DELTA-T = 0.2 SUPPLY-KW = 0.00007  
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY ←  
 COOLING-CAPACITY = 116400. COOL-SH-CAP = 86200.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -414000.  
 ZONE-NAMES = (FRONT-SPAC) ..

FC'S-ZN-#2 =SYSTEM SYSTEM-TYPE = TPFC  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HT\_SET\_F  
 COOLING-SCHEDULE = S\_CL\_SCHED RATED-CFM = 4650.  
 MIN-AIR-SCH = S\_OFF FAN-SCHEDULE = S\_FAN\_CYCL  
 SUPPLY-DELTA-T = 0.2 SUPPLY-KW = 0.00007  
 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  
 COOLING-CAPACITY = 134300. COOL-SH-CAP = 98700.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -488000.  
 ZONE-NAMES = (BACK-SPACE) ..

## \$ HOURLY REPORT DESCRIPTION

AHU-BLK =REPORT-BLOCK VARIABLE-TYPE = FRESH-AIR  
 VARIABLE-LIST = (3,5,6,17) ..  
 FANCL-BLOK =REPORT-BLOCK VARIABLE-TYPE = FC'S-ZN-#2  
 VARIABLE-LIST = (3,5,6,17) ..  
 PERI-BLK =REPORT-BLOCK VARIABLE-TYPE = FRONT-SPAC  
 VARIABLE-LIST = (17,18,7,6) ..  
 CORE-BLK =REPORT-BLOCK VARIABLE-TYPE = CORE-ZONE  
 VARIABLE-LIST = (17,18,7,6) ..  
 AHUS-RPT = HOURLY-REPORT REPORT-SCHEDULE = HRLY-RPT  
 REPORT-BLOCK = (AHU-BLK,FANCL-BLOK)  
 ..  
 ZONE-BLK = HOURLY-REPORT REPORT-SCHEDULE = HRLY-RPT  
 REPORT-BLOCK = (PERI-BLK,CORE-BLK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*



| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 17:20:34 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|
| DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #7450 REGIMENTAL HQ BLDG                       |                             |                         |                      |                      |                             |                         |                      |                      |   |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR FC'S-ZN-#1 TOPEKA, KS                            |                             |                         |                      |                      |                             |                         |                      |                      |   |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) |
| JAN  | 0.00000                     |                         |                      |                      | -5.129                      | 28                      | -2.2.F               | -3.F                 | -58.180                                 |
| FEB  | 0.00000                     |                         |                      |                      | -2.683                      | 7                       | 26.F                 | 25.F                 | -56.005                                 |
| MAR  | 0.00000                     |                         |                      |                      | -1.903                      | 14                      | 15.F                 | 13.F                 | -54.109                                 |
| APR  | 0.00000                     |                         |                      |                      | -0.649                      | 15                      | 51.F                 | 44.F                 | -6.309                                  |
| MAY  | 8.05695                     | 31 17                   | 90.F                 | 75.F                 | -0.854                      | 24                      | 56.F                 | 55.F                 | -21.718                                 |
| JUN  | 16.98055                    | 27 16                   | 89.F                 | 77.F                 | -0.766                      | 11                      | 58.F                 | 56.F                 | -24.007                                 |
| JUL  | 16.69001                    | 13 16                   | 93.F                 | 77.F                 | -0.284                      | 30                      | 62.F                 | 59.F                 | -16.971                                 |
| AUG  | 19.31336                    | 11 13                   | 96.F                 | 73.F                 | -0.388                      | 4                       | 56.F                 | 55.F                 | -16.274                                 |
| SEP  | 14.49438                    | 6 16                    | 93.F                 | 76.F                 | -2.285                      | 18                      | 51.F                 | 50.F                 | -33.688                                 |
| OCT  | 0.03265                     | 1 17                    | 85.F                 | 68.F                 | -0.831                      | 1                       | 46.F                 | 44.F                 | -37.269                                 |
| NOV  | 0.00000                     |                         |                      |                      | -1.434                      | 14                      | 29.F                 | 29.F                 | -36.176                                 |
| DEC  | 0.00000                     |                         |                      |                      | -4.365                      | 12                      | 3.F                  | 2.F                  | -77.704                                 |
| TOTAL  | 75.568                      |                         |                      |                      | -21.572                     |                         |                      |                      | -77.704                                 |
| MAX  |                             |                         |                      |                      |                             |                         |                      |                      | 74.163                                  |
|  |                             |                         |                      |                      |                             |                         |                      |                      | 36832.                                  |
|  |                             |                         |                      |                      |                             |                         |                      |                      | 10.448                                  |

H2-24

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 17:20:34 SDL RUN 1 |                 |                          |  |                            |                            |                              |                           |                                      |  |
|--|-----------------|--------------------------|--|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|
| DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #7450 REGIMENTAL HQ BLDG                       |                 |                          |  |                            |                            |                              |                           |                                      |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR FC'S-ZN-#1 TOPEKA, KS                               |                 |                          |  |                            |                            |                              |                           |                                      |  |
| MONTH  | COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | COINCIDENT LOADS--<br>HEATING ELECTRIC<br>LOAD AT COOLING<br>PEAK (KW) |
| JAN  | 0               | 474                      | 0  | 744                        | 0                          | 629                          | 356                       | 155                                  | -3.029   |
| FEB  | 0               | 416                      | 0  | 663                        | 0                          | 620                          | 373                       | 204                                  | -2.779   |
| MAR  | 0               | 418                      | 0  | 711                        | 0                          | 727                          | 428                       | 309                                  | -2.896   |
| APR  | 0               | 206                      | 0  | 452                        | 0                          | 720                          | 447                       | 514                                  | -3.247   |
| MAY  | 179             | 118                      | 0  | 450                        | 384                        | 594                          | 321                       | 297                                  | 0.000  |
| JUN  | 362             | 67                       | 0  | 491                        | 720                        | 429                          | 143                       | 0                                    | 0.000  |
| JUL  | 375             | 36                       | 0  | 445                        | 720                        | 411                          | 151                       | 0                                    | 0.000  |
| AUG  | 406             | 40                       | 0  | 383                        | 744                        | 446                          | 147                       | 0                                    | 0.000  |
| SEP  | 315             | 139                      | 0  | 538                        | 720                        | 454                          | 181                       | 0                                    | 0.000  |
| OCT  | 3               | 240                      | 0  | 482                        | 24                         | 729                          | 469                       | 486                                  | 0.000  |
| NOV  | 0               | 370                      | 0  | 629                        | 0                          | 701                          | 441                       | 331                                  | -2.751   |
| DEC  | 0               | 512                      | 0  | 744                        | 0                          | 662                          | 389                       | 150                                  | 0.000  |
| ANNUAL   | 1640            | 3036                     | 0  | 6732                       | 3336                       | 7122                         | 3846                      | 2446                                 |  |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 17:20:34 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR FC'S-ZN-#2 TOPEKA, KS

| MONTH | COOLING               |                   |               |               | MAXIMUM COOLING LOAD (KBTU/HR) |        | HEATING               |                   |               |               | HEATING |  |                      |                        | MAXIMUM HEATING LOAD (KBTU/HR) |  | ELECTRIC |  |
|-------|-----------------------|-------------------|---------------|---------------|--------------------------------|--------|-----------------------|-------------------|---------------|---------------|---------|--|----------------------|------------------------|--------------------------------|--|----------|--|
|       | COOLING ENERGY (MBTU) | TIME OF MAX DY HR | DRY-BULB TEMP | WET-BULB TEMP |                                |        | HEATING ENERGY (MBTU) | TIME OF MAX DY HR | DRY-BULB TEMP | WET-BULB TEMP |         |  | HEATING ENERGY (KWH) | MAXIMUM ELEC LOAD (KW) |                                |  |          |  |
| JAN   | 0.00000               |                   |               |               |                                | 0.000  | -5.817                | 31                | 21.F          | 19.F          |         |  | 3107.                | 10.497                 |                                |  |          |  |
| FEB   | 0.00000               |                   |               |               |                                | 0.000  | -3.192                | 28                | 12.F          | 11.F          |         |  | 2818.                | 10.497                 |                                |  |          |  |
| MAR   | 0.00000               |                   |               |               |                                | 0.000  | -2.049                | 14                | 15.F          | 13.F          |         |  | 3415.                | 10.497                 |                                |  |          |  |
| APR   | 0.00000               |                   |               |               |                                | 0.000  | -0.669                | 4                 | 32.F          | 31.F          |         |  | 3139.                | 10.497                 |                                |  |          |  |
| MAY   | 7.40370               | 31                | 90.F          | 75.F          |                                | 75.031 | -0.879                | 24                | 56.F          | 55.F          |         |  | 3097.                | 10.497                 |                                |  |          |  |
| JUN   | 15.71539              | 27                | 89.F          | 77.F          |                                | 68.491 | -0.820                | 2                 | 50.F          | 49.F          |         |  | 3183.                | 10.497                 |                                |  |          |  |
| JUL   | 15.52774              | 13                | 92.F          | 78.F          |                                | 68.717 | -0.296                | 30                | 7             | 62.F          | 59.F    |  | 2897.                | 10.497                 |                                |  |          |  |
| AUG   | 17.43436              | 11                | 98.F          | 71.F          |                                | 68.970 | -0.470                | 4                 | 5             | 55.F          | 54.F    |  | 3324.                | 10.497                 |                                |  |          |  |
| SEP   | 12.82128              | 6                 | 93.F          | 75.F          |                                | 65.156 | -2.599                | 11                | 7             | 40.F          | 40.F    |  | 3057.                | 10.497                 |                                |  |          |  |
| OCT   | 0.00000               |                   |               |               |                                | 0.000  | -0.854                | 1                 | 7             | 46.F          | 44.F    |  | 3004.                | 10.497                 |                                |  |          |  |
| NOV   | 0.00000               |                   |               |               |                                | 0.000  | -1.713                | 14                | 6             | 29.F          | 29.F    |  | 2983.                | 10.497                 |                                |  |          |  |
| DEC   | 0.00000               |                   |               |               |                                | 0.000  | -4.171                | 12                | 6             | 3.F           | 2.F     |  | 3116.                | 10.497                 |                                |  |          |  |
| TOTAL | 68.902                |                   |               |               |                                | 75.031 | -23.529               |                   |               |               |         |  | 37141.               | 10.497                 |                                |  |          |  |
| MAX   |                       |                   |               |               |                                |        |                       |                   |               |               |         |  |                      |                        |                                |  |          |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 17:20:34 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR FC'S-ZN-#2 TOPEKA, KS

| MONTH  | COOLING         |                          |                                 |                   | HEATING                    |                            |                  |                   | ELECTRIC                  |                                      |  |  |
|--------|-----------------|--------------------------|---------------------------------|-------------------|----------------------------|----------------------------|------------------|-------------------|---------------------------|--------------------------------------|--|--|
|        | COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON | HOURS<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | COINCIDENT<br>ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0               | 497                      | 0                               | 247               | 744                        | 0                          | 620              | 347               | 0                         | 123                                  | -2.633   | 1.343  |
| FEB    | 0               | 420                      | 0                               | 252               | 663                        | 0                          | 582              | 335               | 0                         | 162                                  | -2.495   | 1.343  |
| MAR    | 0               | 435                      | 0                               | 309               | 711                        | 0                          | 716              | 417               | 0                         | 281                                  | -2.797   | 1.343  |
| APR    | 0               | 212                      | 0                               | 508               | 452                        | 0                          | 720              | 447               | 0                         | 508                                  | -3.431   | 0.326  |
| MAY    | 170             | 125                      | 0                               | 449               | 450                        | 384                        | 591              | 318               | 0                         | 296                                  | 0.000  | 10.497   |
| JUN    | 351             | 78                       | 0                               | 291               | 491                        | 720                        | 429              | 143               | 0                         | 0                                    | 0.000  | 10.497   |
| JUL    | 358             | 42                       | 0                               | 344               | 445                        | 744                        | 400              | 140               | 0                         | 0                                    | 0.000  | 10.497   |
| AUG    | 380             | 56                       | 0                               | 308               | 383                        | 744                        | 436              | 137               | 0                         | 0                                    | 0.000  | 10.497   |
| SEP    | 293             | 173                      | 0                               | 254               | 538                        | 720                        | 466              | 193               | 0                         | 483                                  | 0.000  | 1.343  |
| OCT    | 0               | 247                      | 0                               | 497               | 482                        | 24                         | 730              | 470               | 0                         | 312                                  | -2.238   | 1.343  |
| NOV    | 0               | 354                      | 0                               | 366               | 629                        | 0                          | 666              | 406               | 0                         | 139                                  | -2.732   | 1.343  |
| DEC    | 0               | 508                      | 0                               | 236               | 744                        | 0                          | 647              | 374               | 0                         | 2304                                 | 0.000  | 0.000  |
| ANNUAL | 1552            | 3147                     | 0                               | 4061              | 6732                       | 3336                       | 7003             | 3727              | 0                         |                                      |  |  |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 17:20:34 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>30.972<br>102.361<br>28/ 9 | NATURAL-GAS<br>37.704<br>222.951<br>28/ 6 |
|-----|--|---|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 27.656<br>102.361<br>3/ 8                 | 23.640<br>228.922<br>28/ 6                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 32.900<br>102.020<br>31/ 7                | 17.215<br>214.108<br>14/ 6                |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 29.650<br>101.801<br>4/ 6                 | 5.215<br>81.283<br>4/ 6                   |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 35.418<br>164.968<br>31/17                | 3.550<br>69.951<br>24/ 5                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 44.174<br>164.183<br>27/17                | 2.758<br>77.644<br>2/ 5                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.172<br>167.316<br>22/16                | 1.038<br>54.545<br>30/ 7                  |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 48.542<br>169.350<br>22/16                | 1.533<br>52.050<br>3/ 5                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 40.642<br>165.722<br>7/16                 | 8.355<br>100.512<br>18/ 7                 |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 28.541<br>102.020<br>31/ 7                | 5.606<br>108.771<br>1/ 7                  |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 28.669<br>102.020<br>29/ 8                | 13.183<br>174.837<br>14/ 6                |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 30.728<br>102.361<br>13/ 8                | 30.818<br>261.103<br>12/ 6                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |   |   |
|     | ONE YEAR<br>USE/PEAK                             | 420.063<br>169.350                        | 150.615<br>261.103                        |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 17:20:34 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 7.28        | 150.61      |
| SPACE COOL      | 61.13       | 0.00        |
| HVAC AUX        | 34.25       | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 224.60      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 92.83       | 0.00        |
| TOTAL           | 420.08      | 150.61      |

TOTAL SITE ENERGY 570.68 MBTU 59.4 KBTU/SQFT-YR GROSS-AREA 178.3 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1412.07 MBTU 147.1 KBTU/SQFT-YR GROSS-AREA 441.3 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 18.1  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 6.0 WIDTH = 2.0 G-T = 2PN-INS  
MULTIPLIER = 4.0 SETBACK = 0.5  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 20.0 WIDTH = 75.0 CONS = FLOOR ..

ROOF HEIGHT = 30.0 WIDTH = 40.0 CONS = BLT-ROOF  
TILT = 0 INSIDE-VIS-REFL = 0.2 ..

CORE-ZONE =SPACE AREA = 800.0 VOLUME = 23200.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 100.0  
PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 6.0  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_EQUI/LIG  
EQUIP-SCHEDULE = L\_EQUI/LIG EQUIPMENT-W/SQFT = 2.48  
FURN-WEIGHT = 0.8 INF-METHOD = NONE ..

ROOF HEIGHT = 20.0 WIDTH = 40.0 CONS = BLT-ROOF  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

U-W HEIGHT = 20.0 WIDTH = 40.0 CONS = FLOOR ..

END ..  
COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
\$ E Z - D O E S Y S T E M S I N P U T \$  
\$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #2 DDC CONTROL FOR BLDG. #7450 \*

LINE-5 \*REGIMENTAL HQ BLDG \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
SYSTEMS-REPORT VERIFICATION=(SV-A)  
SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
HOURLY-DATA-SAVE = YES ..


# \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

```

SD_WT_HT  =DAY-SCHEDULE (1,24) (70.) ..
SD_SM_CL  =DAY-SCHEDULE (1,24) (76.) ..
SD_WT_CL  =DAY-SCHEDULE (1,24) (72.) ..
SD_SM_HT  =DAY-SCHEDULE (1,24) (74.) ..

```



```

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON  ..

```

```

SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF  ..

```

```

SW_WT_HT   =WEEK-SCHEDULE (ALL) SD_WT_HT ..

```

```

SW_SM_CL   =WEEK-SCHEDULE (ALL) SD_SM_CL ..

```

```

SW_WT_CL   =WEEK-SCHEDULE (ALL) SD_WT_CL ..

```

```

SW_SM_HT   =WEEK-SCHEDULE (ALL) SD_SM_HT ..

```

# \$ FULL ON SYSTEM

```

S_ON       =SCHEDULE THRU DEC 31 SW_ON  ..

```

# \$ FULL OFF SYSTEM

```

S_OFF      =SCHEDULE THRU DEC 31 SW_OFF  ..

```

# \$ HEATING SEASON

```

S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON  ..

```

# \$ COOLING SEASON

```

S_CL-SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF  ..

```

# \$ HEATING SET TEMP

```

S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
              THRU OCT  1 SW_SM_HT
              THRU DEC 31 SW_WT_HT  ..

```

# \$ COOLING SET TEMP

```

S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
              THRU OCT  1 SW_SM_CL
              THRU DEC 31 SW_WT_CL  ..

```

```

HRLY-RPT   =SCHEDULE THRU JAN 12 SW_OFF
              THRU JAN 15 SW_ON
              THRU AUG 20 SW_OFF
              THRU AUG 23 SW_ON
              THRU DEC 31 SW_OFF  ..

```

# \$ ZONE DESCRIPTION

```

FRONT-SPAC =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F

```

ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 3950.  
 SIZING-OPTION = FROM-LOADS ..

BACK-SPACE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 4650.  
 SIZING-OPTION = FROM-LOADS ..

CORE-ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 825.  
 OUTSIDE-AIR-CFM = 825. SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

FRESH-AIR =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED SUPPLY-CFM = 825.  
 RATED-CFM = 825. MIN-OUTSIDE-AIR = 1.0  
 SUPPLY-DELTA-T = 1.8 SUPPLY-KW = 0.00059  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 COOLING-CAPACITY = 55000. COOL-SH-CAP = 44000.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -63260.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER SIZING-OPTION = COINCIDENT  
 REFG-FAN-KW = 0.1 REFG-PUMP-KW = 0.0  
 ZONE-NAMES = (CORE-ZONE) ..

FC'S-ZN-#1 =SYSTEM SYSTEM-TYPE = TPFC  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED RATED-CFM = 3950.  
 MIN-AIR-SCH = S\_OFF SUPPLY-DELTA-T = 0.2  
 SUPPLY-KW = 0.00007 NIGHT-CYCLE-CTRL = STAY-OFF  
 COOLING-CAPACITY = 116400. COOL-SH-CAP = 86200.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -414000.  
 ZONE-NAMES = (FRONT-SPAC) ..

FC'S-ZN-#2 =SYSTEM SYSTEM-TYPE = TPFC  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED RATED-CFM = 4650.  
 MIN-AIR-SCH = S\_OFF SUPPLY-DELTA-T = 0.2  
 SUPPLY-KW = 0.00007 NIGHT-CYCLE-CTRL = STAY-OFF  
 COOLING-CAPACITY = 134300. COOL-SH-CAP = 98700.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -488000.  
 ZONE-NAMES = (BACK-SPACE) ..

## \$ HOURLY REPORT DESCRIPTION

```

AHU-BLK  =REPORT-BLOCK VARIABLE-TYPE = FRESH-AIR
          VARIABLE-LIST = (3,5,6,17) ..
FANCL-BLOK =REPORT-BLOCK VARIABLE-TYPE = FC'S-ZN-#2
          VARIABLE-LIST = (3,5,6,17) ..
PERI-BLK  =REPORT-BLOCK VARIABLE-TYPE = FRONT-SPAC
          VARIABLE-LIST = (17,18,7,6) ..
CORE-BLK  =REPORT-BLOCK VARIABLE-TYPE = CORE-ZONE
          VARIABLE-LIST = (17,18,7,6) ..
AHUS-RPT  = HOURLY-REPORT REPORT-SCHEDULE = HRLY-RPT
          REPORT-BLOCK = (AHU-BLK,FANCL-BLOK)
..
ZONE-BLK  = HOURLY-REPORT REPORT-SCHEDULE = HRLY-RPT
          REPORT-BLOCK = (PERI-BLK,CORE-BLK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *   EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *   DENVER,      CO      80227      *

        LINE-4 *RUN #2 DDC CONTROL FOR BLDG. #7450      *
        LINE-5 *REGIMENTAL HQ BLDG                      * ..

```

```

ABORT          ERRORS ..
DIAGNOSTIC     WARNINGS ..
PLANT-REPORT   VERIFICATION=(PV-A)
               SUMMARY=(PS-B,BEPS)
               HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON  =DAY-SCHEDULE (1,24) (1.) ..
PD_OFF =DAY-SCHEDULE (1,24) (0.) ..

PW_OFF =WEEK-SCHEDULE (ALL) PD_OFF ..
PW_ON  =WEEK-SCHEDULE (ALL) PD_ON  ..

```

## \$ HEATING SEASON

```

P_HEAT  =SCHEDULE THRU MAY 15 PW_ON
          THRU OCT  1 PW_OFF
          THRU DEC 31 PW_ON ..

```



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 8:22:58 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR FRESH-AIR TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -25.663                     | 15                      | -8. F                | -9. F                | -71.787                                 | 2303.                              | 7.368                           |
| FEB   | 0.00000                     |                         |                      |                      | -18.899                     | 3                       | -1. F                | -2. F                | -64.311                                 | 2080.                              | 7.368                           |
| MAR   | 0.00000                     |                         |                      |                      | -14.199                     | 4                       | 14. F                | 12. F                | -53.087                                 | 2483.                              | 7.268                           |
| APR   | 0.00000                     |                         |                      |                      | -4.741                      | 3                       | 33. F                | 32. F                | -34.855                                 | 2287.                              | 7.268                           |
| MAY   | 3.30266                     | 31                      | 90. F                | 75. F                | -1.130                      | 1                       | 37. F                | 37. F                | -31.165                                 | 2615.                              | 12.741                          |
| JUN   | 12.22892                    | 27                      | 89. F                | 77. F                | 0.000                       |                         |                      |                      | 0.000                                   | 3545.                              | 13.184                          |
| JUL   | 16.58689                    | 21                      | 89. F                | 79. F                | 0.000                       |                         |                      |                      | 0.000                                   | 3777.                              | 13.494                          |
| AUG   | 17.81778                    | 22                      | 95. F                | 77. F                | 0.000                       |                         |                      |                      | 0.000                                   | 4240.                              | 13.550                          |
| SEP   | 7.66400                     | 7                       | 93. F                | 76. F                | 0.000                       |                         |                      |                      | 0.000                                   | 3024.                              | 13.236                          |
| OCT   | 0.00000                     |                         |                      |                      | -4.206                      | 20                      | 25. F                | 25. F                | -40.042                                 | 2207.                              | 7.268                           |
| NOV   | 0.00000                     |                         |                      |                      | -12.234                     | 3                       | 13. F                | 12. F                | -53.246                                 | 2195.                              | 7.268                           |
| DEC   | 0.00000                     |                         |                      |                      | -22.419                     | 14                      | 2. F                 | 1. F                 | -63.534                                 | 2299.                              | 7.368                           |
| TOTAL | 57.600                      |                         |                      |                      | -103.490                    |                         |                      |                      | -71.787                                 | 33054.                             |                                 |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    | 13.550                          |

H2-33

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 8:22:58 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR FRESH-AIR TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |                            |                   |                            |                            |                  |                           |                           |                                      | C O I N C I D E N T L O A D S                      |  |
|--------|---------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------|---------------------------|---------------------------|--------------------------------------|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON | HOURS<br>FANS<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0                         | 715                      | 0                          | 29                | 744                        | 0                          | 744              | 0                         | 0                         | 29                                   | -31.047  | 1.165  |
| FEB    | 0                         | 651                      | 0                          | 21                | 672                        | 0                          | 672              | 0                         | 0                         | 21                                   | -30.982  | 1.165  |
| MAR    | 0                         | 609                      | 0                          | 135               | 744                        | 0                          | 744              | 0                         | 0                         | 135                                  | -30.800  | 1.165  |
| APR    | 0                         | 352                      | 0                          | 368               | 720                        | 0                          | 720              | 0                         | 0                         | 368                                  | -18.865  | 0.487  |
| MAY    | 211                       | 119                      | 0                          | 414               | 360                        | 213                        | 744              | 0                         | 0                         | 414                                  | 0.000  | 12.741   |
| JUN    | 565                       | 0                        | 0                          | 155               | 0                          | 570                        | 720              | 0                         | 0                         | 155                                  | 0.000  | 13.184   |
| JUL    | 642                       | 0                        | 0                          | 102               | 0                          | 646                        | 744              | 0                         | 0                         | 102                                  | 0.000  | 13.459   |
| AUG    | 651                       | 0                        | 0                          | 93                | 0                          | 655                        | 744              | 0                         | 0                         | 93                                   | 0.000  | 13.525   |
| SEP    | 364                       | 0                        | 0                          | 356               | 0                          | 371                        | 720              | 0                         | 0                         | 356                                  | 0.000  | 13.236   |
| OCT    | 0                         | 348                      | 0                          | 396               | 720                        | 0                          | 744              | 0                         | 0                         | 396                                  | -20.159  | 1.165  |
| NOV    | 0                         | 541                      | 0                          | 179               | 720                        | 0                          | 720              | 0                         | 0                         | 179                                  | -37.420  | 1.165  |
| DEC    | 0                         | 706                      | 0                          | 38                | 744                        | 0                          | 744              | 0                         | 0                         | 38                                   | -41.058  | 0.487  |
| ANNUAL | 2433                      | 4041                     | 0                          | 2286              | 5424                       | 2455                       | 8760             | 0                         | 0                         | 2286                                 |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 8:22:58 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR FC'S-ZN-#1 TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                            |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -8.245                      | 15                      | -6.F                 | -7.F                 | -46.744                                 | 3111.                              | 10.448                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -4.787                      | 3                       | -1.F                 | -2.F                 | -35.101                                 | 2814.                              | 10.448                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -3.148                      | 6                       | 19.F                 | 18.F                 | -32.740                                 | 3387.                              | 10.448                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -1.137                      | 4                       | 33.F                 | 31.F                 | -7.162                                  | 3104.                              | 10.448                          |
| MAY   | 8.61113                     | 31                      | 17                   | 90.F                 | 75.F                                    | -0.556                      | 3                       | 65.F                 | 61.F                 | -5.999                                  | 3111.                              | 10.448                          |
| JUN   | 18.26715                    | 28                      | 17                   | 90.F                 | 76.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 3242.                              | 10.448                          |
| JUL   | 19.09994                    | 13                      | 17                   | 92.F                 | 78.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 2972.                              | 10.448                          |
| AUG   | 21.02761                    | 11                      | 16                   | 100.F                | 71.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 3387.                              | 10.448                          |
| SEP   | 14.40827                    | 7                       | 17                   | 92.F                 | 75.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 3104.                              | 10.448                          |
| OCT   | 0.15326                     | 1                       | 17                   | 85.F                 | 68.F                                    | -1.336                      | 30                      | 46.F                 | 42.F                 | -13.998                                 | 2972.                              | 10.448                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -2.919                      | 12                      | 19.F                 | 18.F                 | -28.891                                 | 2966.                              | 10.448                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -7.239                      | 12                      | 4.F                  | 3.F                  | -40.849                                 | 3111.                              | 10.448                          |
| TOTAL | 81.567                      |                         |                      |                      |   | -29.366                     |                         |                      |                      |   | 37285.                             |                                 |
| TAX   |                             |                         |                      |                      | 67.409                                  |                             |                         |                      |                      | -46.744                                 |                                    | 10.448                          |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 8:22:58 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR FC'S-ZN-#1 TOPEKA, KS

| MONTH  | HOURS           |                 |                   |                    | N U M B E R |                   |                   |                   | H O U R S |                   |                     |                    | C O I N C I D E N T |          |                    |                 | H E A T I N G         |                    |                 |                       | E L E C            |                 |                       |                    |
|--------|-----------------|-----------------|-------------------|--------------------|-------------|-------------------|-------------------|-------------------|-----------|-------------------|---------------------|--------------------|---------------------|----------|--------------------|-----------------|-----------------------|--------------------|-----------------|-----------------------|--------------------|-----------------|-----------------------|--------------------|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | COINCIDENT<br>LOAD | FLOATING    | HEATING<br>AVAIL. | COOLING<br>AVAIL. | HEATING<br>AVAIL. | FLOATING  | COOLING<br>AVAIL. | FANS ON<br>CYCLE ON | FANS ON<br>VENTING | NIGHT<br>WHEN       | FLOATING | HEATING<br>LOAD AT | COOLING<br>PEAK | COINCIDENT<br>LOAD AT | HEATING<br>LOAD AT | COOLING<br>PEAK | COINCIDENT<br>LOAD AT | HEATING<br>LOAD AT | COOLING<br>PEAK | COINCIDENT<br>LOAD AT | HEATING<br>LOAD AT |
| JAN    | 0               | 546             | 0                 | 0                  | 198         | 744               | 0                 | 744               | 0         | 0                 | 0                   | 0                  | 0                   | 198      | -3.261             | 1.294           | 1.294                 | 1.294              | 1.294           | 1.294                 | 1.294              | 1.294           | 1.294                 | 1.294              |
| FEB    | 0               | 445             | 0                 | 0                  | 227         | 672               | 0                 | 672               | 0         | 0                 | 0                   | 0                  | 0                   | 227      | -2.991             | 1.294           | 1.294                 | 1.294              | 1.294           | 1.294                 | 1.294              | 1.294           | 1.294                 | 1.294              |
| MAR    | 0               | 449             | 0                 | 0                  | 295         | 744               | 0                 | 744               | 0         | 0                 | 0                   | 0                  | 0                   | 295      | -2.925             | 1.294           | 1.294                 | 1.294              | 1.294           | 1.294                 | 1.294              | 1.294           | 1.294                 | 1.294              |
| APR    | 0               | 392             | 0                 | 0                  | 328         | 720               | 0                 | 720               | 0         | 0                 | 0                   | 0                  | 0                   | 328      | -3.247             | 0.277           | 0.277                 | 0.277              | 0.277           | 0.277                 | 0.277              | 0.277           | 0.277                 | 0.277              |
| MAY    | 343             | 200             | 0                 | 0                  | 201         | 360               | 384               | 744               | 0         | 0                 | 0                   | 0                  | 0                   | 201      | 0.000              | 10.448          | 10.448                | 10.448             | 10.448          | 10.448                | 10.448             | 10.448          | 10.448                | 10.448             |
| JUN    | 691             | 0               | 0                 | 0                  | 29          | 0                 | 720               | 720               | 0         | 0                 | 0                   | 0                  | 0                   | 29       | 0.000              | 10.448          | 10.448                | 10.448             | 10.448          | 10.448                | 10.448             | 10.448          | 10.448                | 10.448             |
| JUL    | 725             | 0               | 0                 | 0                  | 19          | 0                 | 744               | 744               | 0         | 0                 | 0                   | 0                  | 0                   | 19       | 0.000              | 10.448          | 10.448                | 10.448             | 10.448          | 10.448                | 10.448             | 10.448          | 10.448                | 10.448             |
| AUG    | 735             | 0               | 0                 | 0                  | 9           | 0                 | 744               | 744               | 0         | 0                 | 0                   | 0                  | 0                   | 9        | 0.000              | 10.448          | 10.448                | 10.448             | 10.448          | 10.448                | 10.448             | 10.448          | 10.448                | 10.448             |
| SEP    | 586             | 0               | 0                 | 0                  | 134         | 0                 | 720               | 720               | 0         | 0                 | 0                   | 0                  | 0                   | 134      | 0.000              | 0.277           | 0.277                 | 0.277              | 0.277           | 0.277                 | 0.277              | 0.277           | 0.277                 | 0.277              |
| OCT    | 14              | 419             | 0                 | 0                  | 311         | 720               | 24                | 744               | 0         | 0                 | 0                   | 0                  | 0                   | 311      | 0.000              | 1.294           | 1.294                 | 1.294              | 1.294           | 1.294                 | 1.294              | 1.294           | 1.294                 | 1.294              |
| NOV    | 0               | 457             | 0                 | 0                  | 263         | 720               | 0                 | 744               | 0         | 0                 | 0                   | 0                  | 0                   | 263      | -2.764             | 1.294           | 1.294                 | 1.294              | 1.294           | 1.294                 | 1.294              | 1.294           | 1.294                 | 1.294              |
| DEC    | 0               | 526             | 0                 | 0                  | 218         | 744               | 0                 | 744               | 0         | 0                 | 0                   | 0                  | 0                   | 218      | -28.833            | 0.277           | 0.277                 | 0.277              | 0.277           | 0.277                 | 0.277              | 0.277           | 0.277                 | 0.277              |
| ANNUAL | 3094            | 3434            | 0                 | 0                  | 2232        | 5424              | 3336              | 8760              | 0         | 0                 | 0                   | 0                  | 0                   | 2232     |                    |                 |                       |                    |                 |                       |                    |                 |                       |                    |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 8:22:58 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR FC'S-ZN-#2 TOPEKA, KS

| MONTH | -- C O O L I N G --         |                         |                      |                      | -- H E A T I N G --         |                         |                      |                      | -- E L E C --                           |                           |                      |         |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|----------------------|---------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | ELEC<br>LOAD<br>(KW) | MAXIMUM |
| JAN   | 0.00000                     |                         |                      |                      | -8.783                      | 15                      | 6                    | -8.F                 | -9.F                                    | 3147.                     | 10.497               |         |
| FEB   | 0.00000                     |                         |                      |                      | -5.488                      | 3                       | 5                    | -1.F                 | -2.F                                    | 2847.                     | 10.497               |         |
| MAR   | 0.00000                     |                         |                      |                      | -3.362                      | 6                       | 7                    | 19.F                 | 18.F                                    | 3424.                     | 10.497               |         |
| APR   | 0.00000                     |                         |                      |                      | -1.176                      | 4                       | 5                    | 33.F                 | 31.F                                    | 3139.                     | 10.497               |         |
| MAY   | 7.80364                     | 31                      | 17                   | 90.F                 | 75.F                        | 13                      | 19                   | 78.F                 | 65.F                                    | 3147.                     | 10.497               |         |
| JUN   | 16.72780                    | 27                      | 17                   | 89.F                 | 77.F                        |                         |                      |                      |   | 3278.                     | 10.497               |         |
| JUL   | 17.65842                    | 7                       | 17                   | 83.F                 | 73.F                        |                         |                      |                      |   | 3009.                     | 10.497               |         |
| AUG   | 18.77177                    | 4                       | 17                   | 92.F                 | 70.F                        |                         |                      |                      |   | 3424.                     | 10.497               |         |
| SEP   | 12.18850                    | 7                       | 17                   | 92.F                 | 75.F                        |                         |                      |                      |   | 3139.                     | 10.497               |         |
| OCT   | 0.04249                     | 1                       | 18                   | 83.F                 | 68.F                        | 30                      | 24                   | 46.F                 | 42.F                                    | 3009.                     | 10.497               |         |
| NOV   | 0.00000                     |                         |                      |                      | -1.304                      | 12                      | 6                    | 19.F                 | 18.F                                    | 3001.                     | 10.497               |         |
| DEC   | 0.00000                     |                         |                      |                      | -7.049                      | 12                      | 5                    | 4.F                  | 3.F                                     | 3147.                     | 10.497               |         |
| TOTAL | 73.193                      |                         |                      |                      | -31.276                     |                         |                      |                      |   | 37712.                    |                      |         |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                      | 10.497  |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 8:22:58 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR FC'S-ZN-#2 TOPEKA, KS

| MONTH  | -- N U M B E R O F H O U R S -- |                          |                            |                   | -- C O I N C I D E N T L O A D S -- |                            |                     |                     | -- C O I N C I D E N T L O A D S --     |   |  |         |
|--------|---------------------------------|--------------------------|----------------------------|-------------------|-------------------------------------|----------------------------|---------------------|---------------------|---|---|--|---------|
|        | HOURS<br>COOLING<br>LOAD        | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL.          | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>ON | HOURS<br>FLOTTING<br>WHEN<br>FANS<br>ON | HEATING<br>LOAD AT<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | MAXIMUM |
| JAN    | 0                               | 547                      | 0                          | 197               | 744                                 | 0                          | 744                 | 0                   | 197                                     | -2.857                                  | 1.343  |         |
| FEB    | 0                               | 459                      | 0                          | 213               | 672                                 | 0                          | 672                 | 0                   | 213                                     | -2.696                                  | 1.343  |         |
| MAR    | 0                               | 459                      | 0                          | 285               | 744                                 | 0                          | 744                 | 0                   | 285                                     | -2.818                                  | 1.343  |         |
| APR    | 0                               | 388                      | 0                          | 332               | 720                                 | 0                          | 720                 | 0                   | 332                                     | -3.431                                  | 0.326  |         |
| MAY    | 347                             | 200                      | 0                          | 197               | 360                                 | 384                        | 744                 | 0                   | 197                                     | 0.000                                   | 10.497   |         |
| JUN    | 692                             | 0                        | 0                          | 28                | 0                                   | 720                        | 720                 | 0                   | 28                                      | 0.000                                   | 10.497   |         |
| JUL    | 728                             | 0                        | 0                          | 16                | 0                                   | 744                        | 744                 | 0                   | 16                                      | 0.000                                   | 10.497   |         |
| AUG    | 734                             | 0                        | 0                          | 141               | 0                                   | 744                        | 744                 | 0                   | 10                                      | 0.000                                   | 10.497   |         |
| SEP    | 579                             | 0                        | 0                          | 10                | 0                                   | 720                        | 720                 | 0                   | 141                                     | 0.000                                   | 10.497   |         |
| OCT    | 11                              | 415                      | 0                          | 318               | 720                                 | 24                         | 744                 | 0                   | 318                                     | 0.000                                   | 0.326  |         |
| NOV    | 0                               | 468                      | 0                          | 252               | 720                                 | 0                          | 720                 | 0                   | 252                                     | -3.681                                  | 1.343  |         |
| DEC    | 0                               | 525                      | 0                          | 219               | 744                                 | 0                          | 744                 | 0                   | 219                                     | -25.045                                 | 0.326  |         |
| ANNUAL | 3091                            | 3461                     | 0                          | 2208              | 5424                                | 3336                       | 8760                | 0                   | 2208                                    |   |  |         |

EMC ENGINEERS INC. 80227 E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 8:22:58 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #2 DDC CONTROL FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- PS-B TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>31.990<br>101.031<br>28/ 9 | NATURAL-GAS<br>61.803<br>200.027<br>15/ 6 |
|-----|--|---|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 31.990<br>101.031<br>28/ 9                | 61.803<br>200.027<br>15/ 6                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 28.781<br>101.031<br>3/ 8                 | 44.287<br>170.262<br>3/ 5                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.724<br>100.689<br>15/ 6                | 32.565<br>151.043<br>6/ 7                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 30.200<br>99.131<br>4/ 6                  | 12.184<br>82.219<br>4/ 5                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.018<br>159.593<br>31/17                | 4.000<br>62.818<br>1/ 6                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 47.990<br>158.529<br>27/17                | 0.000<br>0.000<br>30/ 1                   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 47.911<br>161.780<br>22/16                | 0.000<br>0.000<br>31/ 1                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 53.648<br>163.149<br>23/16                | 0.000<br>0.000<br>31/ 1                   |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.168<br>160.208<br>7/16                 | 0.000<br>0.000<br>30/ 1                   |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 29.140<br>99.757<br>20/ 7                 | 11.829<br>76.142<br>30/24                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 29.718<br>100.689<br>3/ 6                 | 29.584<br>144.223<br>12/ 6                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 31.899<br>101.031<br>13/ 8                | 54.594<br>178.597<br>12/ 5                |
|     | ONE YEAR<br>USE/PEAK                             | 444.187<br>163.149                        | 250.846<br>200.027                        |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 8:22:58 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #7450 REGIMENTAL HQ BLDG  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE   |              |                               |                             |
|---|--------------|-------------------------------|-----------------------------|
| IN SITE MBTU -  |              |                               |                             |
| CATEGORY OF USE   | ELECTRICITY  | NATURAL-GAS                   |                             |
| SPACE HEAT  | 10.36        | 250.85                        |                             |
| SPACE COOL  | 73.55        | 0.00                          |                             |
| HVAC AUX  | 42.88        | 0.00                          |                             |
| DOM HOT WTR   | 0.00         | 0.00                          |                             |
| AUX SOLAR   | 0.00         | 0.00                          |                             |
| LIGHTS  | 224.60       | 0.00                          |                             |
| VERT TRANS  | 0.00         | 0.00                          |                             |
| MISC EQUIP  | 92.83        | 0.00                          |                             |
| -----   |              | -----                         |                             |
| TOTAL   | 444.21       | 250.85                        |                             |
|   |              |                               |                             |
| TOTAL SITE ENERGY   | 695.03 MBTU  | 72.4 KBTU/SQFT-YR GROSS-AREA  | 217.2 KBTU/SQFT-YR NET-AREA |
| TOTAL SOURCE ENERGY   | 1584.74 MBTU | 165.1 KBTU/SQFT-YR GROSS-AREA | 495.2 KBTU/SQFT-YR NET-AREA |
| PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 6.3  |              |                               |                             |
| PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0   |              |                               |                             |
| NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY. |              |                               |                             |



**COMPUTER ENERGY SIMULATIONS**

**BLDG. 8021**

**ADMINISTRATION AND SUPPLY BUILDINGS**



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

BUILDING NO.:  
BLDG. TYPE:

8021  
ADMIN & SUPPLY BUILDING

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

### ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3 | RUN4 | RUN5 |
|----------------|---------|---------|---------|------|------|------|
| HEATING (MBtu) | 1166.5  | 793.6   | 1046.7  | 0.0  | 0.0  | 0.0  |
| COOLING (kWH)  | 202,124 | 156,880 | 200,747 | 0    | 0    | 0    |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 31,200 CFM                        |
| FLOOR AREA     | 20,818 FT²                        |
| CFM1           | 13790 CFM                         |
| UA             | 4005 BTU/HR. °F                   |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

#### EZDOE COMPUTER RUN DEFINITION:

| BASERUN | EXISTING OPERATION          |
|---------|-----------------------------|
| RUN1    | NIGHT SETBACK               |
| RUN2    | DDC CONTROL                 |
| RUN3    | ECONOMIZER                  |
| RUN4    | NIGHTTIME INFILTRATION (OA) |
| RUN5    | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      | ANNUAL HEATING & COOLING HOURS |                            |
|--------------------|-------------------|------|--------------------------------|----------------------------|
| M-F                | 700               | 1600 | 45 HR                          | HR. ON HEATING 1459 HR/YR  |
| SAT.               | 0                 | 0    | 0 HR                           | HR. ON COOLING 887 HR/YR   |
| SUN.               | 0                 | 0    | 0 HR                           | HR. OFF HEATING 3989 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 45 HR/WK                       | HR. OFF COOLING 2425 HR/YR |
|                    | TOTAL UNOCC. HR.  |      | 123 HR/WK                      |                            |
|                    | ANNUAL OCCUPY HR. |      | 2346 HR/YR                     |                            |
|                    | ANNUAL UNOCC. HR. |      | 6414 HR/YR                     |                            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING

8760 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY

5448 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

3312 HR/YR

HRS SAVED (HTG ONLY)

5448

1459

=

3989 HR/YR

HRS SAVED (CLG ONLY)

3312

887

=

2425 HR/YR

|           |   |   |               |           |                     |
|-----------|---|---|---------------|-----------|---------------------|
| HOAUHC    | 1166.47 MBtu  | - | 0 MBtu        | =         | 0.00E+00 Btu/CFM-HR |
|           | 13790 CFM   | x | 6414 HR/YR    |           |                     |
| HOAUH     | 1166.47 MBtu  | - | 0 MBtu        | =         | 0.00E+00 Btu/CFM-HR |
|           | 13790 CFM   | x | 3989 HR/YR    |           |                     |
| COAUHC    | 202,124.2 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 13790 CFM   | x | 6414 HR/YR    |           |                     |
| COAUC     | 202,124.2 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 13790 CFM   | x | 2425 HR/YR    |           |                     |
| HOAOHC    | 1166.47 MBtu  | - | 0 MBtu        | =         | 0.00E+00 Btu/CFM-HR |
|           | 13790 CFM   | x | 2346 HR/YR    |           |                     |
| HOAOH     | 1166.47 MBtu  | - | 0 MBtu        | =         | 0.00E+00 Btu/CFM-HR |
|           | 13790 CFM   | x | 1459 HR/YR    |           |                     |
| COAOHC    | 202,124.2 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 13790 CFM   | x | 2346 HR/YR    |           |                     |
| COAOC     | 202,124.2 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 13790 CFM   | x | 887 HR/YR     |           |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | =         | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | =         | 0.17                |
| ECC       | 156,879.6 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 31200 CFM   | x | 887 HR/YR     |           |                     |
| ECHC      | 156,879.6 kWH   | - | 0.0 kWH       | =         | 0.00E+00 kWH/CFM-HR |
|           | 31200 CFM   | x | 2346 HR/YR    |           |                     |
| NSUCHC    | 202,124.2 kWH   | - | 156,879.6 kWH | =         | 2.26E-04 kWH/CFM-HR |
|           | 31200 CFM   | x | 6414 HR/YR    |           |                     |
| NSUCC     | 202,124.2 kWH   | - | 156,879.6 kWH | =         | 5.98E-04 kWH/CFM-HR |
|           | 31200 CFM   | x | 2425 HR/YR    |           |                     |
| DDCCHC    | 202,124.2 kWH   | - | 200,747.1 kWH | =         | 1.88E-05 kWH/CFM-HR |
|           | 31200 CFM   | x | 2346 HR/YR    |           |                     |
| DDCCC     | 202,124.2 kWH   | - | 200,747.1 kWH | =         | 4.98E-05 kWH/CFM-HR |
|           | 31200 CFM   | x | 887 HR/YR     |           |                     |
| NSC       | 1166.47 MBtu  | - | 793.56 MBtu   | =         | 9.31E+04 Btu/UA     |
|           | 4005.072 UA   |   |               |           |                     |
| DDCH      | 1166.47 MBtu  | - | 1046.69 MBtu  | =         | 2.99E+04 Btu/UA     |
|           | 4005.072 UA   |   |               |           |                     |
| OPT       | (2 HR/DAY X 240 DAY/YR)                               |   |               | 175 HR/YR |                     |
|           |   |   |               | =         | 305 HR/YR           |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               |           |                     |
|           |   |   |               | =         | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01          | =         | 5.67 HR/YR          |





INPUT LOADS ..

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$-----$
$ E Z - D O E   L O A D S   I N P U T $
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## \$ GENERAL PROJECT DATA

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TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BLDG. 8021      *
        LINE-5 *ADM. & SUPPORT BLDG      * ..

```

```

ABORT          ERRORS ..
DIAGNOSTIC     WARNINGS ..
LOADS-REPORT   VERIFICATION=(LV-D)
               SUMMARY=(LS-C,LS-D)
               HOURLY-DATA-SAVE = YES ..
BUILDING-LOCATION LATITUDE = 39.0
                LONGITUDE = 96.5
                ALTITUDE = 1065.
                TIME-ZONE = 6
                GROSS-AREA = 23486
                SHIELDING-COEF = 0.29
                X-REF = 0.0
                Y-REF = 0.0 ..
RUN-PERIOD     JAN 1 1994 THRU DEC 31 1994 ...

```

## \$ SCHEDULES

```

LD_OFF        =DAY-SCHEDULE (1,24) (0.) ..

LD_FULL_ON    =DAY-SCHEDULE (1,24) (1.) ..

LD_7-4-M-F    =DAY-SCHEDULE (1,6) (0.)
                (7,16) (1.)
                (17,24) (0.) ..

LW_OFF        =WEEK-SCHEDULE (ALL) LD_OFF ..

LW-7-4M-F     =WEEK-SCHEDULE (WD) LD_7-4-M-F
                (WEH) LD_OFF ..

LW_FULL_ON    =WEEK-SCHEDULE (ALL) LD_FULL_ON ..

L_FULL-OFF    =SCHEDULE THRU DEC 31 LW_OFF ..

L_7-4M-F      =SCHEDULE THRU DEC 31 LW-7-4M-F ..

```

L\_WINTinfl =SCHEDULE THRU MAY 15 LW\_FULL\_ON  
 THRU OCT 1 LW\_OFF  
 THRU DEC 31 LW\_FULL\_ON ..

L\_FULL\_ON =SCHEDULE THRU DEC 31 LW\_FULL\_ON ..

# \$ CONSTRUCTION TYPES

## \$ BUILT UP ROOF ON METAL DECKING

ROOF-1 =CONSTRUCTION U-VALUE = 0.020  
 ABSORPTANCE = 0.500  
 ROUGHNESS = 1 ..

## \$ EXTERIOR WALL CONSTRUCTION

WALL-1 =LAYERS MATERIAL=(CM03,AL11,PW05,IN23,GP02) I-F-R= 0.6100  
 THICKNESS=(0.083,0.000,0.063,0.167,0.052) ..  
 EXWALL-1 =CONSTRUCTION LAYERS = WALL-1  
 ROUGHNESS = 2 ..

## \$ INTERIOR WALL CONSTRUCTION

IW\_LAYER =LAYERS MATERIAL=(GP01,WD01,AL21,GP01)  
 THICKNESS=(0.042,0.063,0.000,0.042) ..  
 INWALL =CONSTRUCTION LAYERS = IW\_LAYER  
 ROUGHNESS = 5 ..

## \$ DOOR CONSTRUCTION

DOORCON =CONSTRUCTION U-VALUE = 0.400 ..

## \$ SLAB FLOOR

FLOOR =CONSTRUCTION U-VALUE = 0.020  
 ABSORPTANCE = 0.750  
 ROUGHNESS = 5 ..  
 VAULT =CONSTRUCTION LAYERS = ASHI-21 ..

## \$ BUILT UP ROOF ON METAL DECKING

ASHR-17A =LAYERS MATERIAL=(HF-E2,HF-E3,HF-B6,HF-A3)  
 THICKNESS=(0.042,0.031,0.167,0.005) ..  
 ROOF-2 =CONSTRUCTION LAYERS = ASHR-17A  
 ABSORPTANCE = 0.500  
 ROUGHNESS = 1 ..

GTYPE\_1 =GLASS-TYPE GLASS-TYPE-CODE = 1  
 PANES = 1 ..  
 GTYPE\_2 =GLASS-TYPE SHADING-COEF = 0.300  
 PANES = 1  
 GLASS-CONDUCTANCE = 0.790 ..  
 GTYPE\_3 =GLASS-TYPE SHADING-COEF = 0.400  
 PANES = 1  
 GLASS-CONDUCTANCE = 0.360 ..

## \$ SPACE DESCRIPTION

1ST\_COMPNY =SPACE AREA = 1331.5 VOLUME = 15978.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_7-4M-F NUMBER-OF-PEOPLE = 12.0  
 PEOPLE-HEAT-GAIN = 1000.0 PEOPLE-HG-LAT = 625.0  
 PEOPLE-HG-SENS = 375.0 LIGHTING-TYPE = SUS-FLUOR  
 LIGHTING-KW = 2.99 LIGHT-TO-SPACE = 1.0  
 LIGHTING-SCHEDULE = L\_7-4M-F  
 EQUIP-SCHEDULE = L\_7-4M-F EQUIPMENT-KW = 0.86  
 FURN-WEIGHT = 1. INF-METHOD = NONE ..

E-W HEIGHT = 12.0 WIDTH = 50.0 CONS = EXWALL-1  
 AZIMUTH = 135 ..

WINDOW HEIGHT = 8.0 WIDTH = 3.0 G-T = GTYPE\_1  
 MULTIPLIER = 6.0 SHADING-DIVISION = 8 ..

E-W HEIGHT = 12.0 WIDTH = 35.0 CONS = EXWALL-1  
 AZIMUTH = 45 ..

U-W HEIGHT = 46.0 WIDTH = 29.0 CONS = FLOOR ..

ROOF HEIGHT = 46.0 WIDTH = 29.0 CONS = ROOF-1  
 TILT = 0 ..

1ARMS-VALT =SPACE AREA = 340.0 VOLUME = 4080.0  
 TEMPERATURE = (68.) ZONE-TYPE = UNCONDITIONED  
 PEOPLE-SCHEDULE = L\_7-4M-F AREA/PERSON = 100.0  
 PEOPLE-HEAT-GAIN = 1000.0 PEOPLE-HG-LAT = 625.0  
 PEOPLE-HG-SENS = 375.0 LIGHTING-TYPE = SUS-FLUOR  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_7-4M-F  
 EQUIP-SCHEDULE = L\_7-4M-F FURN-WEIGHT = 40.  
 INF-METHOD = NONE ..

I-W HEIGHT = 8.0 WIDTH = 17.0 CONS = VAULT  
 AZIMUTH = 135 NEXT-TO = 1ST\_COMPNY ..

I-W HEIGHT = 8.0 WIDTH = 20.0 CONS = VAULT  
 AZIMUTH = 45 NEXT-TO = 1ST\_COMPNY ..

I-W HEIGHT = 8.0 WIDTH = 20.0 CONS = VAULT  
 AZIMUTH = 225 NEXT-TO = 2-COMPNY ..

I-W HEIGHT = 8.0 WIDTH = 17.0 CONS = VAULT  
 AZIMUTH = 315 NEXT-TO = 1EQUPTMAIN ..

ROOF HEIGHT = 17.0 WIDTH = 20.0 CONS = ROOF-1  
 TILT = 0 ..

U-W HEIGHT = 17.0 WIDTH = 20.0 CONS = FLOOR ..

1EQUIPMAN =SPACE AREA = 2832.0 VOLUME = 36816.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_7-4M-F NUMBER-OF-PEOPLE = 10.0  
 PEOPLE-HEAT-GAIN = 1000.0 PEOPLE-HG-LAT = 625.0  
 PEOPLE-HG-SENS = 375.0 LIGHTING-TYPE = SUS-FLUOR  
 LIGHTING-KW = 3.84 LIGHT-TO-SPACE = 1.0  
 LIGHTING-SCHEDULE = L\_7-4M-F  
 EQUIP-SCHEDULE = L\_7-4M-F FURN-WEIGHT = 1.  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.31 ..

E-W HEIGHT = 13.0 WIDTH = 50.0 CONS = EXWALL-1  
 AZIMUTH = 315 ..

E-W HEIGHT = 13.0 WIDTH = 59.0 CONS = EXWALL-1  
 AZIMUTH = 45 ..

ROOF HEIGHT = 50.0 WIDTH = 59.0 CONS = ROOF-2  
 TILT = 0 ..

U-W HEIGHT = 50.0 WIDTH = 59.0 CONS = FLOOR ..

2-COMPNY =SPACE AREA = 1331.5 VOLUME = 15978.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_7-4M-F NUMBER-OF-PEOPLE = 12.0  
 PEOPLE-HEAT-GAIN = 1000.0 PEOPLE-HG-LAT = 625.0  
 PEOPLE-HG-SENS = 375.0 LIGHTING-TYPE = SUS-FLUOR  
 LIGHTING-KW = 2.99 LIGHT-TO-SPACE = 1.0  
 LIGHTING-SCHEDULE = L\_7-4M-F  
 EQUIP-SCHEDULE = L\_7-4M-F EQUIPMENT-KW = 0.86  
 FURN-WEIGHT = 1. INF-METHOD = NONE ..

E-W HEIGHT = 12.0 WIDTH = 50.0 CONS = EXWALL-1  
 AZIMUTH = 135 ..

WINDOW HEIGHT = 8.0 WIDTH = 3.0 G-T = GTYPE\_1  
 MULTIPLIER = 6.0 SHADING-DIVISION = 8 ..

U-W HEIGHT = 46.0 WIDTH = 29.0 CONS = FLOOR ..

ROOF HEIGHT = 46.0 WIDTH = 29.0 CONS = ROOF-1  
 TILT = 0 ..

2-VALT =SPACE AREA = 340.0 VOLUME = 4080.0  
 TEMPERATURE = (68.) ZONE-TYPE = UNCONDITIONED  
 PEOPLE-SCHEDULE = L\_7-4M-F AREA/PERSON = 100.0  
 PEOPLE-HEAT-GAIN = 1000.0 PEOPLE-HG-LAT = 625.0  
 PEOPLE-HG-SENS = 375.0 LIGHTING-TYPE = SUS-FLUOR  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_7-4M-F  
 EQUIP-SCHEDULE = L\_7-4M-F FURN-WEIGHT = 40.  
 INF-METHOD = NONE ..

I-W HEIGHT = 8.0 WIDTH = 17.0 CONS = VAULT  
 AZIMUTH = 135 NEXT-TO = 2-COMPNY ..

I-W HEIGHT = 8.0 WIDTH = 20.0 CONS = VAULT  
 AZIMUTH = 45 NEXT-TO = 2-COMPNY ..

I-W HEIGHT = 8.0 WIDTH = 20.0 CONS = VAULT  
 AZIMUTH = 225 NEXT-TO = 3-VALT ..

I-W HEIGHT = 8.0 WIDTH = 17.0 CONS = VAULT  
 AZIMUTH = 315 NEXT-TO = 2-EQUPMAN ..

ROOF HEIGHT = 17.0 WIDTH = 20.0 CONS = ROOF-1  
 TILT = 0 ..

U-W HEIGHT = 17.0 WIDTH = 20.0 CONS = FLOOR ..

2-EQUPMAN =SPACE AREA = 2832.0 VOLUME = 36816.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_7-4M-F NUMBER-OF-PEOPLE = 10.0  
 PEOPLE-HEAT-GAIN = 1000.0 PEOPLE-HG-LAT = 625.0  
 PEOPLE-HG-SENS = 375.0 LIGHTING-TYPE = SUS-FLUOR  
 LIGHTING-KW = 3.84 LIGHT-TO-SPACE = 1.0  
 LIGHTING-SCHEDULE = L\_7-4M-F  
 EQUIP-SCHEDULE = L\_7-4M-F FURN-WEIGHT = 1.  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.31 ..

E-W HEIGHT = 13.0 WIDTH = 50.0 CONS = EXWALL-1  
 AZIMUTH = 315 ..

ROOF HEIGHT = 50.0 WIDTH = 59.0 CONS = ROOF-2  
 TILT = 0 ..

U-W HEIGHT = 50.0 WIDTH = 59.0 CONS = FLOOR ..

5TH\_COMPNY =SPACE AREA = 1331.5 VOLUME = 15978.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_7-4M-F NUMBER-OF-PEOPLE = 12.0  
 PEOPLE-HEAT-GAIN = 1000.0 PEOPLE-HG-LAT = 625.0  
 PEOPLE-HG-SENS = 375.0 LIGHTING-TYPE = SUS-FLUOR  
 LIGHTING-KW = 2.99 LIGHT-TO-SPACE = 1.0  
 LIGHTING-SCHEDULE = L\_7-4M-F  
 EQUIP-SCHEDULE = L\_7-4M-F EQUIPMENT-KW = 0.86  
 FURN-WEIGHT = 1. INF-METHOD = NONE ..

E-W HEIGHT = 12.0 WIDTH = 50.0 CONS = EXWALL-1  
 AZIMUTH = 135 ..

WINDOW HEIGHT = 8.0 WIDTH = 3.0 G-T = GTYPE\_1  
 MULTIPLIER = 6.0 SHADING-DIVISION = 8 ..

E-W HEIGHT = 12.0 WIDTH = 35.0 CONS = EXWALL-1  
 AZIMUTH = 225 ..

U-W HEIGHT = 46.0 WIDTH = 29.0 CONS = FLOOR ..

ROOF HEIGHT = 46.0 WIDTH = 29.0 CONS = ROOF-1

TILT = 0 ..

5-VALT =SPACE AREA = 340.0 VOLUME = 4080.0  
 TEMPERATURE = (68.) ZONE-TYPE = UNCONDITIONED  
 PEOPLE-SCHEDULE = L\_7-4M-F AREA/PERSON = 100.0  
 PEOPLE-HEAT-GAIN = 1000.0 PEOPLE-HG-LAT = 625.0  
 PEOPLE-HG-SENS = 375.0 LIGHTING-TYPE = SUS-FLUOR  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_7-4M-F  
 EQUIP-SCHEDULE = L\_7-4M-F FURN-WEIGHT = 40.  
 INF-METHOD = NONE ..

I-W HEIGHT = 8.0 WIDTH = 17.0 CONS = VAULT  
 AZIMUTH = 135 NEXT-TO = 5TH\_COMPNY ..

I-W HEIGHT = 8.0 WIDTH = 20.0 CONS = VAULT  
 AZIMUTH = 45 NEXT-TO = 5TH\_COMPNY ..

I-W HEIGHT = 8.0 WIDTH = 20.0 CONS = VAULT  
 AZIMUTH = 225 NEXT-TO = 4-VALT ..

I-W HEIGHT = 8.0 WIDTH = 17.0 CONS = VAULT  
 AZIMUTH = 315 NEXT-TO = 5EQUPTMAIN ..

ROOF HEIGHT = 17.0 WIDTH = 20.0 CONS = ROOF-1  
 TILT = 0 ..

U-W HEIGHT = 17.0 WIDTH = 20.0 CONS = FLOOR ..

5EQUPTMAIN =SPACE AREA = 2832.0 VOLUME = 36816.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_7-4M-F NUMBER-OF-PEOPLE = 10.0  
 PEOPLE-HEAT-GAIN = 1000.0 PEOPLE-HG-LAT = 625.0  
 PEOPLE-HG-SENS = 375.0 LIGHTING-TYPE = SUS-FLUOR  
 LIGHTING-KW = 3.84 LIGHT-TO-SPACE = 1.0  
 LIGHTING-SCHEDULE = L\_7-4M-F  
 EQUIP-SCHEDULE = L\_7-4M-F FURN-WEIGHT = 1.  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.31 ..

E-W HEIGHT = 13.0 WIDTH = 50.0 CONS = EXWALL-1  
 AZIMUTH = 315 ..

E-W HEIGHT = 13.0 WIDTH = 59.0 CONS = EXWALL-1  
 AZIMUTH = 225 ..

ROOF HEIGHT = 50.0 WIDTH = 59.0 CONS = ROOF-2  
 TILT = 0 ..

U-W HEIGHT = 50.0 WIDTH = 59.0 CONS = FLOOR ..

3-COMPNY =SPACE AREA = 1331.5 VOLUME = 15978.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_7-4M-F NUMBER-OF-PEOPLE = 12.0  
 PEOPLE-HEAT-GAIN = 1000.0 PEOPLE-HG-LAT = 625.0

PEOPLE-HG-SENS = 375.0 LIGHTING-TYPE = SUS-FLUOR  
 LIGHTING-KW = 2.99 LIGHT-TO-SPACE = 1.0  
 LIGHTING-SCHEDULE = L\_7-4M-F  
 EQUIP-SCHEDULE = L\_7-4M-F EQUIPMENT-KW = 0.86  
 FURN-WEIGHT = 1. INF-METHOD = NONE ..

E-W HEIGHT = 12.0 WIDTH = 50.0 CONS = EXWALL-1  
 AZIMUTH = 135 ..

WINDOW HEIGHT = 8.0 WIDTH = 3.0 G-T = GTYPE\_1  
 MULTIPLIER = 6.0 SHADING-DIVISION = 8 ..

U-W HEIGHT = 46.0 WIDTH = 29.0 CONS = FLOOR ..

ROOF HEIGHT = 46.0 WIDTH = 29.0 CONS = ROOF-1  
 TILT = 0 ..

3-VALT =SPACE AREA = 340.0 VOLUME = 4080.0  
 TEMPERATURE = (68.) ZONE-TYPE = UNCONDITIONED  
 PEOPLE-SCHEDULE = L\_7-4M-F AREA/PERSON = 100.0  
 PEOPLE-HEAT-GAIN = 1000.0 PEOPLE-HG-LAT = 625.0  
 PEOPLE-HG-SENS = 375.0 LIGHTING-TYPE = SUS-FLUOR  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_7-4M-F  
 EQUIP-SCHEDULE = L\_7-4M-F FURN-WEIGHT = 40.  
 INF-METHOD = NONE ..

I-W HEIGHT = 8.0 WIDTH = 17.0 CONS = VAULT  
 AZIMUTH = 135 NEXT-TO = 3-COMPNY ..

I-W HEIGHT = 8.0 WIDTH = 20.0 CONS = VAULT  
 AZIMUTH = 45 NEXT-TO = 3-COMPNY ..

I-W HEIGHT = 8.0 WIDTH = 20.0 CONS = VAULT  
 AZIMUTH = 225 NEXT-TO = 2-VALT ..

I-W HEIGHT = 8.0 WIDTH = 17.0 CONS = VAULT  
 AZIMUTH = 315 NEXT-TO = 3-EQUPMAN ..

ROOF HEIGHT = 17.0 WIDTH = 20.0 CONS = ROOF-1  
 TILT = 0 ..

U-W HEIGHT = 17.0 WIDTH = 20.0 CONS = FLOOR ..

3-EQUPMAN =SPACE AREA = 2832.0 VOLUME = 36816.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_7-4M-F NUMBER-OF-PEOPLE = 10.0  
 PEOPLE-HEAT-GAIN = 1000.0 PEOPLE-HG-LAT = 625.0  
 PEOPLE-HG-SENS = 375.0 LIGHTING-TYPE = SUS-FLUOR  
 LIGHTING-KW = 3.84 LIGHT-TO-SPACE = 1.0  
 LIGHTING-SCHEDULE = L\_7-4M-F  
 EQUIP-SCHEDULE = L\_7-4M-F FURN-WEIGHT = 1.  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.31 ..

E-W HEIGHT = 13.0 WIDTH = 50.0 CONS = EXWALL-1



AZIMUTH = 315 ..

ROOF HEIGHT = 50.0 WIDTH = 59.0 CONS = ROOF-2  
TILT = 0 ..

U-W HEIGHT = 50.0 WIDTH = 59.0 CONS = FLOOR ..

4-COMPNY =SPACE AREA = 1331.5 VOLUME = 15978.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_7-4M-F NUMBER-OF-PEOPLE = 12.0  
PEOPLE-HEAT-GAIN = 1000.0 PEOPLE-HG-LAT = 625.0  
PEOPLE-HG-SENS = 375.0 LIGHTING-TYPE = SUS-FLUOR  
LIGHTING-KW = 2.99 LIGHT-TO-SPACE = 1.0  
LIGHTING-SCHEDULE = L\_7-4M-F  
EQUIP-SCHEDULE = L\_7-4M-F EQUIPMENT-KW = 0.86  
FURN-WEIGHT = 1. INF-METHOD = NONE ..

E-W HEIGHT = 12.0 WIDTH = 50.0 CONS = EXWALL-1  
AZIMUTH = 135 ..

WINDOW HEIGHT = 8.0 WIDTH = 3.0 G-T = GTYPE\_1  
MULTIPLIER = 6.0 SHADING-DIVISION = 8 ..

U-W HEIGHT = 46.0 WIDTH = 29.0 CONS = FLOOR ..

ROOF HEIGHT = 46.0 WIDTH = 29.0 CONS = ROOF-1  
TILT = 0 ..

4-VALT =SPACE AREA = 340.0 VOLUME = 4080.0  
TEMPERATURE = (68.) ZONE-TYPE = UNCONDITIONED  
PEOPLE-SCHEDULE = L\_7-4M-F AREA/PERSON = 100.0  
PEOPLE-HEAT-GAIN = 1000.0 PEOPLE-HG-LAT = 625.0  
PEOPLE-HG-SENS = 375.0 LIGHTING-TYPE = SUS-FLUOR  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_7-4M-F  
EQUIP-SCHEDULE = L\_7-4M-F FURN-WEIGHT = 40.  
INF-METHOD = NONE ..

I-W HEIGHT = 8.0 WIDTH = 17.0 CONS = VAULT  
AZIMUTH = 135 NEXT-TO = 4-COMPNY ..

I-W HEIGHT = 8.0 WIDTH = 20.0 CONS = VAULT  
AZIMUTH = 45 NEXT-TO = 4-COMPNY ..

I-W HEIGHT = 8.0 WIDTH = 20.0 CONS = VAULT  
AZIMUTH = 225 NEXT-TO = 5-VALT ..

I-W HEIGHT = 8.0 WIDTH = 17.0 CONS = VAULT  
AZIMUTH = 315 NEXT-TO = 4-EQUPMAN ..

ROOF HEIGHT = 17.0 WIDTH = 20.0 CONS = ROOF-1  
TILT = 0 ..

U-W HEIGHT = 17.0 WIDTH = 20.0 CONS = FLOOR ..

```

4-EQUIPMAN =SPACE  AREA = 2832.0  VOLUME = 36816.0
                    TEMPERATURE = (73.)  ZONE-TYPE = CONDITIONED
                    PEOPLE-SCHEDULE = L_7-4M-F  NUMBER-OF-PEOPLE = 10.0
                    PEOPLE-HEAT-GAIN = 1000.0  PEOPLE-HG-LAT = 625.0
                    PEOPLE-HG-SENS = 375.0  LIGHTING-TYPE = SUS-FLUOR
                    LIGHTING-KW = 3.84  LIGHT-TO-SPACE = 1.0
                    LIGHTING-SCHEDULE = L_7-4M-F
                    EQUIP-SCHEDULE = L_7-4M-F  FURN-WEIGHT = 1.
                    INF-METHOD = AIR-CHANGE  AIR-CHANGES/HR = 0.31  ..

```

```

E-W  HEIGHT = 13.0  WIDTH = 50.0  CONS = EXWALL-1
      AZIMUTH = 315  ..

```

```

ROOF  HEIGHT = 50.0  WIDTH = 59.0  CONS = ROOF-2
      TILT = 0  ..

```

```

U-W  HEIGHT = 50.0  WIDTH = 59.0  CONS = FLOOR ..

```

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

#### \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BLDG. 8021      *
        LINE-5 *ADM. & SUPPORT BLDG                      * ..

ABORT      ERRORS      ..
DIAGNOSTIC  WARNINGS  ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES  ..

```

#### \$ SCHEDULES

```

SD_FULL      =DAY-SCHEDULE  (1,24) (1.)  ..
SD_WT_HT      =DAY-SCHEDULE  (1,24) (74.)  ..
SD_SM_CL      =DAY-SCHEDULE  (1,24) (72.)  ..
SD_OTAIR_#    =DAY-SCHEDULE  (1,24) (0.07)  ..
SD_OFF        =DAY-SCHEDULE  (1,24) (0.)  ..
SD_OA#_WT     =DAY-SCHEDULE  (1,24) (0.)  ..
SD_SM_HT      =DAY-SCHEDULE  (1,24) (70.)  ..
SD_WT_CL      =DAY-SCHEDULE  (1,24) (76.)  ..

```

```

SW_FULL_ON =WEEK-SCHEDULE  (ALL) SD_FULL  ..

```

```

SW_WT_HT   =WEEK-SCHEDULE (ALL) SD_WT_HT  ..

SW_SM_CL   =WEEK-SCHEDULE (ALL) SD_SM_CL  ..

SW_OTAIR_% =WEEK-SCHEDULE (ALL) SD_OTAIR_% ..

SW_off     =WEEK-SCHEDULE (ALL) SD_OFF    ..

SW_OA%_SM  =WEEK-SCHEDULE (ALL) SD_OA%_WT  ..

SW_SM_HT   =WEEK-SCHEDULE (ALL) SD_SM_HT  ..

SW_WT_CL   =WEEK-SCHEDULE (ALL) SD_WT_CL  ..


S_FULL_ON  =SCHEDULE THRU DEC 31 SW_FULL_ON ..

S_FULL_OFF =SCHEDULE THRU DEC 31 SW_off    ..

S_HEAT_SET =SCHEDULE THRU MAY 15 SW_WT_HT
              THRU OCT  1 SW_SM_HT
              THRU DEC 31 SW_WT_HT  ..

$ OUTSIDE_AIR_0.07%
S_OTSIDAIR =SCHEDULE THRU DEC 31 SW_OTAIR_% ..

S_HE_SCHED =SCHEDULE THRU MAY 15 SW_FULL_ON
              THRU OCT  1 SW_off
              THRU DEC 31 SW_FULL_ON  ..

S_CL_SCHED =SCHEDULE THRU MAY 15 SW_off
              THRU OCT  1 SW_FULL_ON
              THRU DEC 31 SW_off    ..

$ %OA_WINTER_%OA_SUM
S_OA_S_VNT =SCHEDULE THRU MAY 15 SW_OA%_SM
              THRU OCT  1 SW_FULL_ON
              THRU DEC 31 SW_OA%_SM  ..

S_HRLY-RPT =SCHEDULE THRU JAN 13 SW_off
              THRU JAN 15 SW_FULL_ON
              THRU AUG 20 SW_off
              THRU AUG 21 SW_FULL_ON
              THRU AUG 22 SW_off
              THRU AUG 23 SW_FULL_ON
              THRU DEC 31 SW_off    ..

S_COOL_SET =SCHEDULE THRU MAY 15 SW_WT_CL
              THRU OCT  1 SW_SM_CL
              THRU DEC 31 SW_WT_CL  ..

```

\$ ZONE DESCRIPTION

1ST\_COMPNY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS RATED-CFM = 3600.0  
HEATING-CAPACITY = -68484.0  
COOLING-CAPACITY = 68484.0 COOL-SH-CAP = 57094.0 ..

1ARMS-VALT =ZONE DESIGN-HEAT-T = 68.0 DESIGN-COOL-T = 80.0  
ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

1EQUPTMAIN =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS RATED-CFM = 2400.0  
HEATING-CAPACITY = -45000.0 ..

2-COMPNY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS RATED-CFM = 3600.0  
HEATING-CAPACITY = -68484.0  
COOLING-CAPACITY = 68484.0 COOL-SH-CAP = 57094.0 ..

2-VALT =ZONE DESIGN-HEAT-T = 68.0 DESIGN-COOL-T = 80.0  
ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

2-EQUPTMAN =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS RATED-CFM = 2400.0  
HEATING-CAPACITY = -45000.0 ..

5TH\_COMPNY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS RATED-CFM = 3600.0  
HEATING-CAPACITY = -68484.0  
COOLING-CAPACITY = 68484.0 COOL-SH-CAP = 57094.0 ..

5-VALT =ZONE DESIGN-HEAT-T = 68.0 DESIGN-COOL-T = 80.0  
ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

5EQUPTMAIN =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS RATED-CFM = 2400.0  
HEATING-CAPACITY = -45000.0 ..

3-COMPNY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET

ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS RATED-CFM = 3600.0  
 HEATING-CAPACITY = -68484.0  
 COOLING-CAPACITY = 68484.0 COOL-SH-CAP = 57094.0 ..

3-VALT =ZONE DESIGN-HEAT-T = 68.0 DESIGN-COOL-T = 80.0  
 ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

3-EQUPMAN =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS RATED-CFM = 2400.0  
 HEATING-CAPACITY = -45000.0 ..

4-COMPNY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS RATED-CFM = 3600.0  
 HEATING-CAPACITY = -68484.0  
 COOLING-CAPACITY = 68484.0 COOL-SH-CAP = 57094.0 ..

4-VALT =ZONE DESIGN-HEAT-T = 68.0 DESIGN-COOL-T = 80.0  
 ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

4-EQUPMAN =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS RATED-CFM = 2400.0  
 HEATING-CAPACITY = -45000.0 ..

#### \$ SYSTEM DESCRIPTION

2\_PIP\_F.C. =SYSTEM SYSTEM-TYPE = TPFC  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 50.0  
 HEATING-SCHEDULE = S\_HE\_SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED RATED-CFM = 18000.  
 MIN-OUTSIDE-AIR = 0.07 SUPPLY-DELTA-T = 0.2  
 SUPPLY-KW = 0.00007 NIGHT-CYCLE-CTRL = STAY-OFF  
 COOLING-CAPACITY = 342420. COOL-SH-CAP = 285470.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -1027260.  
 ZONE-NAMES = (1ST\_COMPNY, 1ARMS-VALT, 2-COMPNY,  
 2-VALT, 5TH\_COMPNY, 5-VALT, 3-COMPNY,  
 3-VALT, 4-COMPNY, 4-VALT) ..

H&V =SYSTEM SYSTEM-TYPE = HVSYS  
 MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S\_HE\_SCHED  
 OA-CONTROL = FIXED SUPPLY-CFM = 12000.  
 MIN-AIR-SCH = S\_OA\_S\_VNT SUPPLY-DELTA-T = 2.4  
 SUPPLY-KW = 0.00078  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0

HEATING-CAPACITY = -195000.  
 ZONE-NAMES = (1EQUPTMAIN, 2-EQUPTMAN, SEQUPTMAIN,  
 3-EQUPTMAN, 4-EQUPTMAN) ..

## \$ HOURLY REPORT DESCRIPTION

FC\_BLOCK =REPORT-BLOCK VARIABLE-TYPE = 2\_PIP\_F.C.  
 VARIABLE-LIST = (3,5,6,17) ..  
 H&V\_BLOCK =REPORT-BLOCK VARIABLE-TYPE = H&V  
 VARIABLE-LIST = (3,5,6,17,22) ..  
 OFFIC-BLK =REPORT-BLOCK VARIABLE-TYPE = 1ST\_COMPNY  
 VARIABLE-LIST = (17,18,7,6) ..  
 MAIN\_BLOCK =REPORT-BLOCK VARIABLE-TYPE = 1EQUPTMAIN  
 VARIABLE-LIST = (17,18,7,6) ..  
 AHU'S-RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (FC\_BLOCK,H&V\_BLOCK)  
 ..  
 ZONE-HRLYS = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (OFFIC-BLK,MAIN\_BLOCK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*BASELINE SIMULATION FOR BLDG. 8021 \*  
 LINE-5 \*ADM. & SUPPORT BLDG \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
 SUMMARY=(PS-B,BEPS)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_heaton =DAY-SCHEDULE (1,24) (1.) ..  
 Pd\_heatoff =DAY-SCHEDULE (1,24) (0.) ..  
 PD\_coolon =DAY-SCHEDULE (1,24) (1.) ..  
 PD\_cooloff =DAY-SCHEDULE (1,24) (0.) ..

PW\_heaton =WEEK-SCHEDULE (ALL) PD\_heaton ..

PW\_heatoff =WEEK-SCHEDULE (ALL) Pd\_heatoff ..

Pw\_coolon =WEEK-SCHEDULE (ALL) PD\_coolon ..

Pw\_cooloff =WEEK-SCHEDULE (ALL) PD\_cooloff ..

PHeat =SCHEDULE THRU MAY 15 PW\_heaton  
THRU OCT 1 PW\_heatoff  
THRU DEC 31 PW\_heaton ..

PCool =SCHEDULE THRU MAY 15 Pw\_cooloff  
THRU OCT 1 Pw\_coolon  
THRU DEC 31 Pw\_cooloff ..

# \$ EQUIPMENT DESCRIPTION

STM-PLANT =PLANT-EQUIPMENT TYPE = STM-BOILER  
SIZE = -999. INSTALLED-NUMBER = 2  
MAX-NUMBER-AVAIL = 2 ..

COOL\_PLANT =PLANT-EQUIPMENT TYPE = ABSOR1-CHLR  
SIZE = -999. INSTALLED-NUMBER = 2  
MAX-NUMBER-AVAIL = 2 ..

PLANT-PARAMETERS BOILER-FUEL = NATURAL-GAS CCIRC-MOTOR-EFF = 0.75  
HCIRC-MOTOR-EFF = 0.75 HCIRC-DESIGN-T-DROP = 20.0 ..

PART-LOAD-RATIO TYPE = STM-BOILER  
MIN-RATIO = 0.2500 MAX-RATIO = 1.0000  
OPERATING-RATIO = 1.0000 ELEC-INPUT-RATIO = 0.0220 ..

ENERGY-RESOURCE RESOURCE = ELECTRICITY ..  
ENERGY-RESOURCE RESOURCE = NATURAL-GAS ..

COOL\_SEASO =LOAD-ASSIGNMENT TYPE = COOLING  
OPERATION-MODE = RUN-NEEDED  
  
LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = COOL\_PLANT  
NUMBER = 2 ..

HEAT\_SEASO =LOAD-ASSIGNMENT TYPE = HEATING  
OPERATION-MODE = RUN-NEEDED  
  
LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = STM-PLANT  
NUMBER = 2 ..





| EMC ENGINEERS INC.                                       |  | EZDOE - ELITE SOFTWARE DEVELOPMENT INC |      | DOE-2.1D 5/16/1995  |         | 10: 7: 7 LDL RUN 1 |           |
|--|--|--|------|---------------------|---------|--------------------|-----------|
| DENVER, CO   |  | 80227                                  |      | ADM. & SUPPORT BLDG |         |                    |           |
| REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT |  |  |      |                     |         |                    |           |
| -----  |  |  |      |                     |         |                    |           |
|  |  |  |      |                     |         |                    |           |
|  |  |  |      |                     |         |                    |           |
|  |  |  |      |                     |         |                    |           |
|  |  |  |      |                     |         |                    |           |
|  |  |  |      |                     |         |                    |           |
|  |  |  |      |                     |         |                    |           |
| 2-EQUIPMAN   |  | 0.000                                  | 0.00 | 0.127               | 2950.00 | 2950.00            | ROOF      |
| 3-EQUIPMAN   |  | 0.000                                  | 0.00 | 0.127               | 2950.00 | 2950.00            | ROOF      |
| 1EQUIPMAN  |  | 0.000                                  | 0.00 | 0.127               | 2950.00 | 2950.00            | ROOF      |
| 4-COMPNY   |  | 0.000                                  | 0.00 | 0.020               | 1334.00 | 1334.00            | ROOF      |
| 4-VALT   |  | 0.000                                  | 0.00 | 0.020               | 340.00  | 340.00             | ROOF      |
| 1ST COMPNY   |  | 0.000                                  | 0.00 | 0.020               | 1334.00 | 1334.00            | ROOF      |
| 4-EQUIPMAN   |  | 0.000                                  | 0.00 | 0.127               | 2950.00 | 2950.00            | ROOF      |
| 1ST COMPNY   |  | 0.000                                  | 0.00 | 0.020               | 1334.00 | 1334.00            | UNDERGRND |
| 1ARMS-VALT   |  | 0.000                                  | 0.00 | 0.020               | 340.00  | 340.00             | UNDERGRND |
| 1EQUIPMAN  |  | 0.000                                  | 0.00 | 0.020               | 2950.00 | 2950.00            | UNDERGRND |
| 2-COMPNY   |  | 0.000                                  | 0.00 | 0.020               | 1334.00 | 1334.00            | UNDERGRND |
| 2-VALT   |  | 0.000                                  | 0.00 | 0.020               | 340.00  | 340.00             | UNDERGRND |
| 2-EQUIPMAN   |  | 0.000                                  | 0.00 | 0.020               | 2950.00 | 2950.00            | UNDERGRND |
| 5TH COMPNY   |  | 0.000                                  | 0.00 | 0.020               | 1334.00 | 1334.00            | UNDERGRND |
| 5-VALT   |  | 0.000                                  | 0.00 | 0.020               | 340.00  | 340.00             | UNDERGRND |
| 5EQUIPMAN  |  | 0.000                                  | 0.00 | 0.020               | 2950.00 | 2950.00            | UNDERGRND |
| 3-COMPNY   |  | 0.000                                  | 0.00 | 0.020               | 1334.00 | 1334.00            | UNDERGRND |
| 3-VALT   |  | 0.000                                  | 0.00 | 0.020               | 340.00  | 340.00             | UNDERGRND |
| 3-EQUIPMAN   |  | 0.000                                  | 0.00 | 0.020               | 2950.00 | 2950.00            | UNDERGRND |
| 4-COMPNY   |  | 0.000                                  | 0.00 | 0.020               | 1334.00 | 1334.00            | UNDERGRND |
| 4-VALT   |  | 0.000                                  | 0.00 | 0.020               | 340.00  | 340.00             | UNDERGRND |
| 4-EQUIPMAN   |  | 0.000                                  | 0.00 | 0.020               | 2950.00 | 2950.00            | UNDERGRND |
| -----  |  |  |      |                     |         |                    |           |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC ADM. & SUPPORT BLDG 10: 7: 7 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 8021  
 REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS

\*\*\* BUILDING \*\*\*

FLOOR AREA 20818 SQFT 1934 SQMT  
 VOLUME 263970 CUFT 7476 CUMT

COOLING LOAD  
 =====  
 TIME DRY-BULB TEMP 100F 38C  
 WET-BULB TEMP 71F 22C  
 AUG 11 4PM  
 HEATING LOAD  
 =====  
 JAN 4 3AM  
 8F -13C  
 7F -14C

|                      | SENSIBLE         |                | LATENT   |        | SENSIBLE          |                |
|----------------------|------------------|----------------|----------|--------|-------------------|----------------|
|                      | (KBTU/H)         | ( KW )         | (KBTU/H) | ( KW ) | (KBTU/H)          | ( KW )         |
| WALLS                | 20.057           | 5.874          | 0.000    | 0.000  | -47.657           | -13.958        |
| ROOFS                | 76.283           | 22.341         | 0.000    | 0.000  | -129.198          | -37.839        |
| GLASS CONDUCTION     | 14.119           | 4.135          | 0.000    | 0.000  | -55.765           | -16.332        |
| GLASS SOLAR          | 53.275           | 15.603         | 0.000    | 0.000  | 1.383             | 0.405          |
| DOOR                 | 0.000            | 0.000          | 0.000    | 0.000  | 0.000             | 0.000          |
| INTERNAL SURFACES    | -5.695           | -1.668         | 0.000    | 0.000  | -5.695            | -1.668         |
| UNDERGROUND SURFACES | -2.027           | -0.594         | 0.000    | 0.000  | -12.300           | -3.602         |
| OCCUPANTS TO SPACE   | 41.902           | 12.272         | 65.945   | 19.314 | 2.716             | 0.795          |
| LIGHT TO SPACE       | 102.646          | 30.062         | 0.000    | 0.000  | 10.228            | 2.996          |
| EQUIPMENT TO SPACE   | 13.487           | 3.950          | 0.000    | 0.000  | 0.874             | 0.256          |
| PROCESS TO SPACE     | 0.000            | 0.000          | 0.000    | 0.000  | 0.000             | 0.000          |
| INFILTRATION         | 27.174           | 7.959          | 3.730    | 1.093  | -147.891          | -43.313        |
| TOTAL                | 341.223          | 99.936         | 69.675   | 20.406 | -383.304          | -112.260       |
| TOTAL LOAD           | 410.898 KBTU/H   | 120.342 KW     |          |        | -383.304 KBTU/H   | -112.260 KW    |
| TOTAL LOAD / AREA    | 19.74 BTU/H.SQFT | 62.224 W /SQMT |          |        | 18.413 BTU/H.SQFT | 58.045 W /SQMT |

\*\*\*\*\*  
 \* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR \*  
 \* ----- LOADS \*  
 \* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION \*  
 \* IN CONSIDERATION \*  
 \*\*\*\*\*

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 10: 7: 7 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 8021 ADM. & SUPPORT BLDG  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR 2\_PIP\_F.C. TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                           |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -34.494                     | 15                      | 9                    | -6.F                 | -135.616                                | 4297.                     | 19.586                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -23.329                     | 3                       | 6                    | -2.F                 | -121.064                                | 3887.                     | 19.586                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -14.772                     | 14                      | 6                    | 15.F                 | -107.451                                | 4682.                     | 19.586                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -2.034                      | 5                       | 6                    | 31.F                 | -63.247                                 | 4289.                     | 19.586                          |
| MAY   | 25.39890                    | 16                      | 2                    | 62.F                 | 59.F                                    | -0.399                      | 9                       | 6                    | 44.F                 | -19.714                                 | 4297.                     | 19.586                          |
| JUN   | 57.86850                    | 24                      | 12                   | 84.F                 | 76.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 4481.                     | 19.586                          |
| JUL   | 67.40594                    | 1                       | 16                   | 86.F                 | 80.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 4104.                     | 19.586                          |
| AUG   | 71.34351                    | 23                      | 16                   | 96.F                 | 77.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 4682.                     | 19.586                          |
| SEP   | 45.86646                    | 7                       | 15                   | 92.F                 | 76.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 4289.                     | 19.586                          |
| OCT   | 0.68924                     | 1                       | 15                   | 82.F                 | 67.F                                    | -2.136                      | 2                       | 6                    | 53.F                 | -54.155                                 | 4104.                     | 19.586                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -11.580                     | 2                       | 6                    | 15.F                 | -93.824                                 | 4096.                     | 19.586                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -31.279                     | 12                      | 6                    | 3.F                  | -128.025                                | 4297.                     | 19.586                          |
| TOTAL | 268.572                     |                         |                      |                      |   | -120.022                    |                         |                      |                      |   | 51502.                    |                                 |
| MAX   |                             |                         |                      |                      | 182.727                                 |                             |                         |                      |                      | -135.616                                |                           | 19.586                          |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 10: 7: 7 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 8021 ADM. & SUPPORT BLDG  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR 2\_PIP\_F.C. TOPEKA, KS

| MONTH  | H O U R S       |                 |                   |          | H O U R S         |                   |         |                     | C O I N C I D E N T |                  |                    |                     | C O I N C I D E N T |                 |                 |                 |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|---------|---------------------|---------------------|------------------|--------------------|---------------------|---------------------|-----------------|-----------------|-----------------|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | FANS ON<br>CYCLE ON | HOURS<br>NIGHT      | FLOATING<br>WHEN | HEATING<br>LOAD AT | ELECTRIC<br>LOAD AT | COOLING<br>PEAK     | COOLING<br>PEAK | COOLING<br>PEAK | COOLING<br>PEAK |
| JAN    | 0               | 646             | 0                 | 98       | 744               | 0                 | 744     | 0                   | 0                   | 0                | -11.914            | 0.344               | 0.344               | 0.344           | 0.344           | 0.344           |
| FEB    | 0               | 556             | 0                 | 116      | 672               | 0                 | 672     | 0                   | 0                   | 0                | -7.735             | 0.344               | 0.344               | 0.344           | 0.344           | 0.344           |
| MAR    | 0               | 542             | 0                 | 202      | 744               | 0                 | 744     | 0                   | 0                   | 0                | -17.510            | 0.344               | 0.344               | 0.344           | 0.344           | 0.344           |
| APR    | 0               | 457             | 0                 | 263      | 720               | 0                 | 720     | 0                   | 0                   | 0                | -1.914             | 0.344               | 0.344               | 0.344           | 0.344           | 0.344           |
| MAY    | 350             | 227             | 0                 | 167      | 360               | 384               | 744     | 0                   | 0                   | 0                | 0.000              | 0.344               | 0.344               | 0.344           | 0.344           | 0.344           |
| JUN    | 699             | 0               | 0                 | 21       | 0                 | 720               | 720     | 0                   | 0                   | 0                | 0.000              | 0.344               | 0.344               | 0.344           | 0.344           | 0.344           |
| JUL    | 744             | 0               | 0                 | 1        | 0                 | 744               | 744     | 0                   | 0                   | 0                | 0.000              | 0.344               | 0.344               | 0.344           | 0.344           | 0.344           |
| AUG    | 743             | 0               | 0                 | 108      | 0                 | 744               | 744     | 0                   | 0                   | 0                | 0.000              | 0.344               | 0.344               | 0.344           | 0.344           | 0.344           |
| SEP    | 612             | 0               | 0                 | 253      | 0                 | 720               | 720     | 0                   | 0                   | 0                | 0.000              | 0.344               | 0.344               | 0.344           | 0.344           | 0.344           |
| OCT    | 17              | 474             | 0                 | 190      | 720               | 24                | 744     | 0                   | 0                   | 0                | 0.000              | 0.344               | 0.344               | 0.344           | 0.344           | 0.344           |
| NOV    | 0               | 530             | 0                 | 101      | 720               | 0                 | 720     | 0                   | 0                   | 0                | -48.955            | 0.344               | 0.344               | 0.344           | 0.344           | 0.344           |
| DEC    | 0               | 643             | 0                 | 1520     | 744               | 0                 | 744     | 0                   | 0                   | 0                | -85.856            | 0.344               | 0.344               | 0.344           | 0.344           | 0.344           |
| ANNUAL | 3165            | 4075            | 0                 | 1520     | 5424              | 3336              | 8760    | 0                   | 0                   | 0                |                    |                     |                     |                 |                 |                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 10: 7: 7 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 8021 ADM. & SUPPORT BLDG  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR H&V TOPEKA, KS

| MONTH        | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                           |                                 |
|--------------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|              | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN          | 0.00000                     |                         |                      |                      | 0.000                                   | -62.477                     | 16                      | 7                    | 12.F                 | 9.F                                     | 10994.                    | 28.552                          |
| FEB          | 0.00000                     |                         |                      |                      | 0.000                                   | -45.660                     | 3                       | 6                    | -1.F                 | -2.F                                    | 9936.                     | 28.552                          |
| MAR          | 0.00000                     |                         |                      |                      | 0.000                                   | -33.283                     | 3                       | 5                    | 15.F                 | 13.F                                    | 11378.                    | 28.552                          |
| APR          | 0.00000                     |                         |                      |                      | 0.000                                   | -8.176                      | 5                       | 6                    | 31.F                 | 28.F                                    | 10770.                    | 28.552                          |
| MAY          | 0.00000                     |                         |                      |                      | 0.000                                   | -0.503                      | 9                       | 6                    | 44.F                 | 44.F                                    | 10994.                    | 28.552                          |
| JUN          | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 10961.                    | 28.552                          |
| JUL          | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 10802.                    | 28.552                          |
| AUG          | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 11378.                    | 28.552                          |
| SEP          | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 10770.                    | 28.552                          |
| OCT          | 0.00000                     |                         |                      |                      | 0.000                                   | -4.335                      | 2                       | 2                    | 64.F                 | 59.F                                    | 10802.                    | 28.552                          |
| NOV          | 0.00000                     |                         |                      |                      | 0.000                                   | -22.457                     | 2                       | 6                    | 15.F                 | 14.F                                    | 10578.                    | 28.552                          |
| DEC          | 0.00000                     |                         |                      |                      | 0.000                                   | -53.419                     | 12                      | 6                    | 3.F                  | 2.F                                     | 10994.                    | 28.552                          |
| TOTAL<br>MAX | 0.000                       |                         |                      |                      | 0.000                                   | -230.310                    |                         |                      |                      | -160.034                                | 130357.                   | 28.552                          |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 10: 7: 7 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 8021 ADM. & SUPPORT BLDG  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR H&V TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |                            |                   |                            |                            |                     |                     |                           |                                      | C O I N C I D E N T L O A D S                      |  |  |  |
|--------|---------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|---------------------|---------------------|---------------------------|--------------------------------------|--|--|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 744                 | 0                   | 0                         | 0                                    | -62.952  | 9.360  | -62.952  | 9.360  |
| FEB    | 0                         | 672                      | 0                          | 0                 | 672                        | 0                          | 672                 | 0                   | 0                         | 0                                    | -62.644  | 9.360  | -62.644  | 9.360  |
| MAR    | 0                         | 714                      | 0                          | 30                | 744                        | 0                          | 744                 | 0                   | 0                         | 30                                   | -60.989  | 9.360  | -60.989  | 9.360  |
| APR    | 0                         | 545                      | 0                          | 175               | 720                        | 0                          | 720                 | 0                   | 0                         | 175                                  | -3.179   | 9.360  | -3.179   | 9.360  |
| MAY    | 0                         | 206                      | 0                          | 538               | 360                        | 0                          | 744                 | 0                   | 0                         | 538                                  | 0.000  | 9.360  | 0.000  | 9.360  |
| JUN    | 0                         | 0                        | 0                          | 720               | 0                          | 0                          | 720                 | 0                   | 0                         | 720                                  | 0.000  | 9.360  | 0.000  | 9.360  |
| JUL    | 0                         | 0                        | 0                          | 744               | 0                          | 0                          | 744                 | 0                   | 0                         | 744                                  | 0.000  | 9.360  | 0.000  | 9.360  |
| AUG    | 0                         | 0                        | 0                          | 744               | 0                          | 0                          | 744                 | 0                   | 0                         | 744                                  | 0.000  | 9.360  | 0.000  | 9.360  |
| SEP    | 0                         | 0                        | 0                          | 720               | 0                          | 0                          | 720                 | 0                   | 0                         | 720                                  | 0.000  | 9.360  | 0.000  | 9.360  |
| OCT    | 0                         | 491                      | 0                          | 253               | 720                        | 0                          | 744                 | 0                   | 0                         | 253                                  | -34.568  | 9.360  | -34.568  | 9.360  |
| NOV    | 0                         | 631                      | 0                          | 89                | 720                        | 0                          | 720                 | 0                   | 0                         | 89                                   | -69.537  | 9.360  | -69.537  | 9.360  |
| DEC    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 744                 | 0                   | 0                         | 0                                    | -91.490  | 9.360  | -91.490  | 9.360  |
| ANNUAL | 0                         | 4747                     | 0                          | 4013              | 5424                       | 0                          | 8760                | 0                   | 0                         | 4013                                 |  |  |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 10: 7: 7 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 8021 ADM. & SUPPORT BLDG  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>56.659<br>170.784<br>31/ 9 | NATURAL-GAS<br>144.201<br>372.445<br>16/ 6 |
|-----|--|---|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 51.137<br>170.784<br>28/10                | 107.814<br>331.575<br>3/ 6                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 57.955<br>170.784<br>31/ 8                | 78.037<br>304.178<br>14/ 6                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.399<br>170.784<br>5/ 7                 | 19.762<br>197.220<br>5/ 6                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 57.477<br>181.872<br>31/16                | 60.623<br>361.491<br>16/ 2                 |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 63.517<br>181.872<br>30/16                | 132.817<br>362.843<br>27/16                |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 62.749<br>181.872<br>29/16                | 155.058<br>379.143<br>1/16                 |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 66.737<br>181.872<br>31/16                | 161.597<br>369.729<br>23/14                |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 60.349<br>181.872<br>28/16                | 105.164<br>364.372<br>7/16                 |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 51.780<br>169.300<br>31/ 7                | 15.123<br>180.875<br>2/ 2                  |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.576<br>170.784<br>29/ 7                | 57.244<br>255.011<br>2/ 6                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 56.529<br>170.784<br>30/16                | 129.033<br>351.483<br>12/ 6                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |   |  |
|     | ONE YEAR<br>USE/PEAK                             | 689.864<br>181.872                        | 1166.474<br>379.143                        |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 10: 7: 7 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 8021 ADM. & SUPPORT BLDG  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 20.08       | 552.10      |
| SPACE COOL      | 41.11       | 614.37      |
| HVAC AUX        | 297.96      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 293.72      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 36.98       | 0.00        |
| TOTAL           | 689.85      | 1166.47     |

TOTAL SITE ENERGY 1856.34 MBTU 79.0 KBTU/SQFT-YR GROSS-AREA 89.2 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 3238.14 MBTU 137.9 KBTU/SQFT-YR GROSS-AREA 155.5 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 3.1  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



4-EQUIPMAN =SPACE AREA = 2832.0 VOLUME = 36816.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_7-4M-F NUMBER-OF-PEOPLE = 10.0  
 PEOPLE-HEAT-GAIN = 1000.0 PEOPLE-HG-LAT = 625.0  
 PEOPLE-HG-SENS = 375.0 LIGHTING-TYPE = SUS-FLUOR  
 LIGHTING-KW = 3.84 LIGHT-TO-SPACE = 1.0  
 LIGHTING-SCHEDULE = L\_7-4M-F  
 EQUIP-SCHEDULE = L\_7-4M-F FURN-WEIGHT = 1.  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.31 ..

E-W HEIGHT = 13.0 WIDTH = 50.0 CONS = EXWALL-1  
 AZIMUTH = 315 ..

ROOF HEIGHT = 50.0 WIDTH = 59.0 CONS = ROOF-2  
 TILT = 0 ..

U-W HEIGHT = 50.0 WIDTH = 59.0 CONS = FLOOR ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..


\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #1 NIGHT SETBACK FOR BLDG. 8021 \*  
 LINE-5 \*ADM. & SUPPORT BLDG \* ..  
 ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_FULL =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,6) (55.)  
 (7,16) (74.)  
 (17,24) (55.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,6) (85.)  
 (7,16) (72.)  
 (17,24) (85.) ..  
 SD\_OTAIR\_% =DAY-SCHEDULE (1,24) (0.07) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_OA%\_WT =DAY-SCHEDULE (1,24) (0.) ..





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SD_SM_HT   =DAY-SCHEDULE (1,6) (83.)
              (7,16) (70.)
              (17,24) (83.) ..
SD_WT_CL   =DAY-SCHEDULE (1,6) (57.)
              (7,16) (76.)
              (17,24) (57.) ..
SD_FAN_CYC =DAY-SCHEDULE (1,6) (-1.)
              (7,16) (1.)
              (17,24) (-1.) ..
SD_WT_HT_D =DAY-SCHEDULE (1,24) (55.) ..
SD_SM_CL_D =DAY-SCHEDULE (1,24) (85.) ..
SD_WT_CL_D =DAY-SCHEDULE (1,24) (57.) ..
SD_SM_HT_D =DAY-SCHEDULE (1,24) (83.) ..

SW_FULL_ON =WEEK-SCHEDULE (ALL) SD_FULL ..

SW_WT_HT   =WEEK-SCHEDULE (WD) SD_WT_HT
              (WEH) SD_WT_HT_D ..

SW_SM_CL   =WEEK-SCHEDULE (WD) SD_SM_CL
              (WEH) SD_SM_CL_D ..

SW_OTAIR_% =WEEK-SCHEDULE (ALL) SD_OTAIR_% ..

SW_off     =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_OA%_SM  =WEEK-SCHEDULE (ALL) SD_OA%_WT ..

SW_SM_HT   =WEEK-SCHEDULE (WD) SD_SM_HT
              (WEH) SD_SM_HT_D ..

SW_WT_CL   =WEEK-SCHEDULE (WD) SD_WT_CL
              (WEH) SD_WT_CL_D ..

SW_FAN_CYC =WEEK-SCHEDULE (WD) SD_FAN_CYC
              (WEH) SD_OFF ..

S_FULL_ON  =SCHEDULE THRU DEC 31 SW_FULL_ON ..

S_FULL_OFF =SCHEDULE THRU DEC 31 SW_off ..

S_HEAT_SET =SCHEDULE THRU MAY 15 SW_WT_HT
              THRU OCT 1 SW_SM_HT
              THRU DEC 31 SW_WT_HT ..

$ OUTSIDE_AIR_0.07%
S_OTSIDAIR =SCHEDULE THRU DEC 31 SW_OTAIR_% ..

S_HE_SCHED =SCHEDULE THRU MAY 15 SW_FULL_ON
              THRU OCT 1 SW_off
              THRU DEC 31 SW_FULL_ON ..

S_CL_SCHED =SCHEDULE THRU MAY 15 SW_off
              THRU OCT 1 SW_FULL_ON
              THRU DEC 31 SW_off ..

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\$ %OA\_WINTER\_%OA\_SUM

S\_OA\_S\_VNT =SCHEDULE THRU MAY 15 SW\_OA%\_SM  
THRU OCT 1 SW\_FULL\_ON  
THRU DEC 31 SW\_OA%\_SM ..

S\_HRLY-RPT =SCHEDULE THRU JAN 13 SW\_off  
THRU JAN 15 SW\_FULL\_ON  
THRU AUG 20 SW\_off  
THRU AUG 21 SW\_FULL\_ON  
THRU AUG 22 SW\_off  
THRU AUG 23 SW\_FULL\_ON  
THRU DEC 31 SW\_off ..

S\_COOL\_SET =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

# \$ ZONE DESCRIPTION

1ST\_COMPNY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS RATED-CFM = 3600.0  
HEATING-CAPACITY = -68484.0  
COOLING-CAPACITY = 68484.0 COOL-SH-CAP = 57094.0 ..

1ARMS-VALT =ZONE DESIGN-HEAT-T = 68.0 DESIGN-COOL-T = 80.0  
ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

1EQUPMAIN =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS RATED-CFM = 2400.0  
HEATING-CAPACITY = -45000.0 ..

2-COMPNY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS RATED-CFM = 3600.0  
HEATING-CAPACITY = -68484.0  
COOLING-CAPACITY = 68484.0 COOL-SH-CAP = 57094.0 ..

2-VALT =ZONE DESIGN-HEAT-T = 68.0 DESIGN-COOL-T = 80.0  
ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

2-EQUPMAN =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
ZONE-TYPE = CONDITIONED

THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS RATED-CFM = 2400.0  
 HEATING-CAPACITY = -45000.0 ..

5TH\_COMPNY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS RATED-CFM = 3600.0  
 HEATING-CAPACITY = -68484.0  
 COOLING-CAPACITY = 68484.0 COOL-SH-CAP = 57094.0 ..

5-VALT =ZONE DESIGN-HEAT-T = 68.0 DESIGN-COOL-T = 80.0  
 ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

5EQUPMAIN =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS RATED-CFM = 2400.0  
 HEATING-CAPACITY = -45000.0 ..

3-COMPNY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS RATED-CFM = 3600.0  
 HEATING-CAPACITY = -68484.0  
 COOLING-CAPACITY = 68484.0 COOL-SH-CAP = 57094.0 ..

3-VALT =ZONE DESIGN-HEAT-T = 68.0 DESIGN-COOL-T = 80.0  
 ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

3-EQUPMAN =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS RATED-CFM = 2400.0  
 HEATING-CAPACITY = -45000.0 ..

4-COMPNY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS RATED-CFM = 3600.0  
 HEATING-CAPACITY = -68484.0  
 COOLING-CAPACITY = 68484.0 COOL-SH-CAP = 57094.0 ..

4-VALT =ZONE DESIGN-HEAT-T = 68.0 DESIGN-COOL-T = 80.0  
 ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

4-EQUPMAN =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS RATED-CFM = 2400.0

HEATING-CAPACITY = -45000.0 ..

## \$ SYSTEM DESCRIPTION

2\_PIP\_F.C. =SYSTEM SYSTEM-TYPE = TPFC  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 50.0  
 HEATING-SCHEDULE = S\_HE\_SCHD  
 COOLING-SCHEDULE = S\_CL\_SCHD RATED-CFM = 18000.  
 MIN-OUTSIDE-AIR = 0.07 FAN-SCHEDULE = S\_FAN\_CYC  
 SUPPLY-DELTA-T = 0.2 SUPPLY-KW = 0.00007  
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY ←  
 COOLING-CAPACITY = 342420. COOL-SH-CAP = 285470.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -1027260.  
 ZONE-NAMES = (1ST\_COMPNY, 1ARMS-VALT, 2-COMPNY,  
 2-VALT, 5TH\_COMPNY, 5-VALT, 3-COMPNY,  
 3-VALT, 4-COMPNY, 4-VALT) ..

H&V =SYSTEM SYSTEM-TYPE = HVSYS  
 MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S\_HE\_SCHD  
 OA-CONTROL = FIXED SUPPLY-CFM = 12000.  
 MIN-AIR-SCH = S\_OA\_S\_VNT FAN-SCHEDULE = S\_FAN\_CYC  
 SUPPLY-DELTA-T = 2.4 SUPPLY-KW = 0.00078  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY NIGHT-VENT-DT = 0.0 ←  
 HEATING-CAPACITY = -195000.  
 ZONE-NAMES = (1EQUPTMAIN, 2-EQUPTMAN, 5EQUPTMAIN,  
 3-EQUPTMAN, 4-EQUPTMAN) ..

## \$ HOURLY REPORT DESCRIPTION

FC\_BLOCK =REPORT-BLOCK VARIABLE-TYPE = 2\_PIP\_F.C.  
 VARIABLE-LIST = (3,5,6,17) ..  
 H&V\_BLOCK =REPORT-BLOCK VARIABLE-TYPE = H&V  
 VARIABLE-LIST = (3,5,6,17,22) ..  
 OFFIC-BLK =REPORT-BLOCK VARIABLE-TYPE = 1ST\_COMPNY  
 VARIABLE-LIST = (17,18,7,6) ..  
 MAIN\_BLOCK =REPORT-BLOCK VARIABLE-TYPE = 1EQUPTMAIN  
 VARIABLE-LIST = (17,18,7,6) ..  
 AHU'S-RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (FC\_BLOCK,H&V\_BLOCK)  
 ..  
 ZONE-HRLYS = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (OFFIC-BLK,MAIN\_BLOCK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 10:47:48 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 8021 ADM. & SUPPORT BLDG  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR 2\_PIP\_F.C. TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                           |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -15.740                     | 17                      | 7                    | 24.F                 | -267.956                                | 4172.                     | 19.586                          |
| FEB   | 0.00000                     |                         |                      |                      | -9.221                      | 7                       | 7                    | 25.F                 | -269.115                                | 3789.                     | 19.586                          |
| MAR   | 0.00000                     |                         |                      |                      | -4.201                      | 14                      | 7                    | 14.F                 | -213.156                                | 4570.                     | 19.586                          |
| APR   | 0.00000                     |                         |                      |                      | -0.365                      | 5                       | 7                    | 27.F                 | -43.832                                 | 4187.                     | 19.586                          |
| MAY   | 16.41863                    | 16                      | 7                    | 57.F                 | -0.110                      | 7                       | 2                    | 44.F                 | -4.841                                  | 4186.                     | 19.586                          |
| JUN   | 36.29034                    | 27                      | 7                    | 72.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 4349.                     | 19.586                          |
| JUL   | 39.63266                    | 18                      | 7                    | 76.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 3949.                     | 19.586                          |
| AUG   | 43.48590                    | 24                      | 14                   | 94.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 4529.                     | 19.586                          |
| SEP   | 31.72237                    | 6                       | 7                    | 75.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 4164.                     | 19.586                          |
| OCT   | 0.05722                     | 1                       | 12                   | 75.F                 | -0.368                      | 31                      | 7                    | 39.F                 | -45.669                                 | 4008.                     | 19.586                          |
| NOV   | 0.00000                     |                         |                      |                      | -2.215                      | 14                      | 7                    | 32.F                 | -156.019                                | 4000.                     | 19.586                          |
| DEC   | 0.00000                     |                         |                      |                      | -13.233                     | 12                      | 8                    | 1.F                  | -302.088                                | 4184.                     | 19.586                          |
| TOTAL | 167.607                     |                         |                      |                      | -45.453                     |                         |                      |                      | -302.088                                | 50086.                    | 19.586                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 10:47:48 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 8021 ADM. & SUPPORT BLDG  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR 2\_PIP\_F.C. TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |  |                   |                            |                            |                              |                           |                                      |  | --COINCIDENT LOADS--                           |  |
|--------|---------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |
| JAN    | 0                         | 311                      | 0  | 433               | 744                        | 0                          | 382                          | 172                       | 0                                    | 0.000  | 0.000  |  |
| FEB    | 0                         | 305                      | 0  | 367               | 672                        | 0                          | 387                          | 197                       | 0                                    | 0.000  | 0.000  |  |
| MAR    | 0                         | 255                      | 0  | 489               | 744                        | 0                          | 419                          | 189                       | 0                                    | 0.000  | 0.000  |  |
| APR    | 0                         | 164                      | 0  | 556               | 720                        | 0                          | 426                          | 216                       | 0                                    | -1.998   | 0.344  |  |
| MAY    | 155                       | 87                       | 0  | 502               | 360                        | 384                        | 421                          | 211                       | 0                                    | 0.000  | 19.586   |  |
| JUN    | 285                       | 0                        | 0  | 435               | 0                          | 720                        | 337                          | 117                       | 0                                    | 0.000  | 19.586   |  |
| JUL    | 291                       | 0                        | 0  | 453               | 0                          | 744                        | 292                          | 92                        | 0                                    | 0.000  | 19.586   |  |
| AUG    | 295                       | 0                        | 0  | 449               | 0                          | 744                        | 300                          | 70                        | 0                                    | 0.000  | 19.586   |  |
| SEP    | 274                       | 0                        | 0  | 446               | 0                          | 720                        | 358                          | 148                       | 0                                    | 0.000  | 19.586   |  |
| OCT    | 10                        | 197                      | 0  | 537               | 720                        | 24                         | 464                          | 264                       | 0                                    | 0.000  | 0.344  |  |
| NOV    | 0                         | 248                      | 0  | 472               | 720                        | 0                          | 440                          | 240                       | 0                                    | 0.000  | 0.000  |  |
| DEC    | 0                         | 331                      | 0  | 413               | 744                        | 0                          | 416                          | 206                       | 0                                    | 0.000  | 0.000  |  |
| ANNUAL | 1310                      | 1898                     | 0  | 5552              | 5424                       | 3336                       | 4642                         | 2122                      | 0                                    | 1434   |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 10:47:48 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 8021 ADM. & SUPPORT BLDG  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR H&V TOPEKA, KS

| MONTH        | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                           |                                 |
|--------------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|              | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN          | 0.00000                     |                         |                      |                      | -50.799                     | 16                      | 6                    | 10.F                 | 8.F                                     | 7840.                     | 28.552                          |
| FEB          | 0.00000                     |                         |                      |                      | -41.954                     | 2                       | 10                   | 14.F                 | 12.F                                    | 7409.                     | 28.552                          |
| MAR          | 0.00000                     |                         |                      |                      | -30.873                     | 3                       | 8                    | 15.F                 | 12.F                                    | 8355.                     | 28.552                          |
| APR          | 0.00000                     |                         |                      |                      | -9.598                      | 1                       | 7                    | 48.F                 | 44.F                                    | 8018.                     | 28.552                          |
| MAY          | 0.00000                     |                         |                      |                      | -0.651                      | 5                       | 7                    | 44.F                 | 40.F                                    | 8242.                     | 28.552                          |
| JUN          | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 7742.                     | 28.552                          |
| JUL          | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 7068.                     | 28.552                          |
| AUG          | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 7681.                     | 28.552                          |
| SEP          | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 7990.                     | 28.552                          |
| OCT          | 0.00000                     |                         |                      |                      | -4.365                      | 20                      | 7                    | 23.F                 | 23.F                                    | 8181.                     | 28.552                          |
| NOV          | 0.00000                     |                         |                      |                      | -22.519                     | 3                       | 7                    | 19.F                 | 17.F                                    | 7957.                     | 28.552                          |
| DEC          | 0.00000                     |                         |                      |                      | -46.332                     | 12                      | 10                   | 6.F                  | 5.F                                     | 7999.                     | 28.552                          |
| TOTAL<br>MAX | 0.000                       |                         |                      |                      | -207.090                    |                         |                      |                      | -194.500                                | 94481.                    | 28.552                          |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 10:47:48 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 8021 ADM. & SUPPORT BLDG  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR H&V TOPEKA, KS

| MONTH  | HOURS           |                 |                                 |          | HOURS             |                   |         |                   | HOURS   |                   |         |                   | HOURS             |         |                   |         | HOURS             |         |                   |         |
|--------|-----------------|-----------------|---------------------------------|----------|-------------------|-------------------|---------|-------------------|---------|-------------------|---------|-------------------|-------------------|---------|-------------------|---------|-------------------|---------|-------------------|---------|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COINCIDENT<br>COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | COOLING<br>AVAIL. | FANS ON | COOLING<br>AVAIL. | FANS ON | COOLING<br>AVAIL. | HEATING<br>AVAIL. | FANS ON | COOLING<br>AVAIL. | FANS ON | HEATING<br>AVAIL. | FANS ON | COOLING<br>AVAIL. | FANS ON |
| JAN    | 0               | 407             | 0                               | 337      | 744               | 0                 | 407     | 0                 | 407     | 0                 | 197     | 0                 | 0                 | 0       | 0                 | 0       | 0                 | 0       | 0                 | 0       |
| FEB    | 0               | 402             | 0                               | 326      | 672               | 0                 | 402     | 0                 | 421     | 0                 | 212     | 0                 | 0                 | 0       | 0                 | 0       | 0                 | 0       | 0                 | 0       |
| MAR    | 0               | 418             | 0                               | 301      | 744               | 0                 | 421     | 0                 | 426     | 0                 | 191     | 0                 | 0                 | 0       | 0                 | 0       | 0                 | 0       | 0                 | 0       |
| APR    | 0               | 89              | 0                               | 655      | 360               | 0                 | 450     | 0                 | 376     | 0                 | 216     | 0                 | 0                 | 0       | 0                 | 0       | 0                 | 0       | 0                 | 0       |
| MAY    | 0               | 0               | 0                               | 720      | 0                 | 0                 | 376     | 0                 | 345     | 0                 | 156     | 0                 | 0                 | 0       | 0                 | 0       | 0                 | 0       | 0                 | 0       |
| JUN    | 0               | 0               | 0                               | 744      | 0                 | 0                 | 345     | 0                 | 349     | 0                 | 145     | 0                 | 0                 | 0       | 0                 | 0       | 0                 | 0       | 0                 | 0       |
| JUL    | 0               | 0               | 0                               | 744      | 0                 | 0                 | 423     | 0                 | 423     | 0                 | 119     | 0                 | 0                 | 0       | 0                 | 0       | 0                 | 0       | 0                 | 0       |
| AUG    | 0               | 0               | 0                               | 720      | 0                 | 0                 | 423     | 0                 | 423     | 0                 | 213     | 0                 | 0                 | 0       | 0                 | 0       | 0                 | 0       | 0                 | 0       |
| SEP    | 0               | 250             | 0                               | 494      | 720               | 0                 | 464     | 0                 | 440     | 0                 | 264     | 0                 | 0                 | 0       | 0                 | 0       | 0                 | 0       | 0                 | 0       |
| OCT    | 0               | 388             | 0                               | 332      | 720               | 0                 | 440     | 0                 | 424     | 0                 | 240     | 0                 | 0                 | 0       | 0                 | 0       | 0                 | 0       | 0                 | 0       |
| NOV    | 0               | 424             | 0                               | 320      | 744               | 0                 | 424     | 0                 | 424     | 0                 | 214     | 0                 | 0                 | 0       | 0                 | 0       | 0                 | 0       | 0                 | 0       |
| DEC    | 0               | 0               | 0                               | 0        | 0                 | 0                 | 0       | 0                 | 0       | 0                 | 0       | 0                 | 0                 | 0       | 0                 | 0       | 0                 | 0       | 0                 | 0       |
| ANNUAL | 0               | 2679            | 0                               | 6081     | 5424              | 0                 | 4927    | 0                 | 4927    | 0                 | 2407    | 0                 | 0                 | 0       | 0                 | 0       | 0                 | 0       | 0                 | 0       |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 10:47:48 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 8021 ADM. & SUPPORT BLDG  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>44.532<br>182.206<br>17/ 8<br>41.586<br>182.206<br>7/ 7<br>46.815<br>173.285<br>31/13<br>42.660<br>173.285<br>15/ 7<br>45.254<br>185.343<br>31/16<br>46.657<br>185.343<br>30/16<br>43.428<br>185.343<br>29/16<br>47.675<br>185.343<br>31/16<br>46.542<br>185.343<br>28/16<br>42.240<br>173.285<br>31/ 7<br>42.981<br>173.285<br>30/10<br>45.053<br>182.206<br>12/10 | NATURAL-GAS<br>102.474<br>609.945<br>17/ 7<br>82.966<br>606.058<br>7/ 7<br>59.859<br>482.454<br>14/ 7<br>19.346<br>272.746<br>5/ 7<br>39.220<br>377.043<br>31/16<br>81.847<br>410.019<br>27/ 7<br>90.241<br>431.037<br>18/ 7<br>97.448<br>428.984<br>24/14<br>71.403<br>428.653<br>6/ 7<br>10.705<br>215.634<br>31/ 7<br>44.263<br>362.394<br>10/ 7<br>93.786<br>688.539<br>12/ 8 |
|-----|--|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 44.532<br>182.206<br>17/ 8   | 102.474<br>609.945<br>17/ 7   |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 41.586<br>182.206<br>7/ 7  | 82.966<br>606.058<br>7/ 7   |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 46.815<br>173.285<br>31/13   | 59.859<br>482.454<br>14/ 7  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.660<br>173.285<br>15/ 7   | 19.346<br>272.746<br>5/ 7   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 45.254<br>185.343<br>31/16   | 39.220<br>377.043<br>31/16  |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 46.657<br>185.343<br>30/16   | 81.847<br>410.019<br>27/ 7  |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 43.428<br>185.343<br>29/16   | 90.241<br>431.037<br>18/ 7  |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 47.675<br>185.343<br>31/16   | 97.448<br>428.984<br>24/14  |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 46.542<br>185.343<br>28/16   | 71.403<br>428.653<br>6/ 7   |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.240<br>173.285<br>31/ 7   | 10.705<br>215.634<br>31/ 7  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.981<br>173.285<br>30/10   | 44.263<br>362.394<br>10/ 7  |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 45.053<br>182.206<br>12/10   | 93.786<br>688.539<br>12/ 8  |
|     | ONE YEAR<br>USE/PEAK                             | 535.423<br>185.343   | 793.558<br>688.539  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 10:47:48 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 8021 ADM. & SUPPORT BLDG  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 16.80       | 415.20      |
| SPACE COOL      | 21.55       | 378.36      |
| HVAC AUX        | 166.38      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 293.72      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 36.98       | 0.00        |
| TOTAL           | 535.43      | 793.56      |

TOTAL SITE ENERGY 1328.98 MBTU 56.6 KBTU/SQFT-YR GROSS-AREA 63.8 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2401.44 MBTU 102.2 KBTU/SQFT-YR GROSS-AREA 115.4 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 17.1  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.





4-EQUIPMAN =SPACE AREA = 2832.0 VOLUME = 36816.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_7-4M-F NUMBER-OF-PEOPLE = 10.0  
 PEOPLE-HEAT-GAIN = 1000.0 PEOPLE-HG-LAT = 625.0  
 PEOPLE-HG-SENS = 375.0 LIGHTING-TYPE = SUS-FLUOR  
 LIGHTING-KW = 3.84 LIGHT-TO-SPACE = 1.0  
 LIGHTING-SCHEDULE = L\_7-4M-F  
 EQUIP-SCHEDULE = L\_7-4M-F FURN-WEIGHT = 1.  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.31 ..

E-W HEIGHT = 13.0 WIDTH = 50.0 CONS = EXWALL-1  
 AZIMUTH = 315 ..

ROOF HEIGHT = 50.0 WIDTH = 59.0 CONS = ROOF-2  
 TILT = 0 ..

U-W HEIGHT = 50.0 WIDTH = 59.0 CONS = FLOOR ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #2 DDC CONTROL FOR BLDG. 8021 \*  
 LINE-5 \*ADM. & SUPPORT BLDG \* ..  
 ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

# \$ SCHEDULES

SD\_FULL =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,24) (70.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,24) (76.) ..  
 SD\_OTAIR\_% =DAY-SCHEDULE (1,24) (0.07) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_OA%\_WT =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_SM\_HT =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,24) (72.) ..

SW\_FULL\_ON =WEEK-SCHEDULE (ALL) SD\_FULL ..

```

SW_WT_HT  =WEEK-SCHEDULE (ALL) SD_WT_HT  ..
SW_SM_CL  =WEEK-SCHEDULE (ALL) SD_SM_CL  ..
SW_OTAIR_% =WEEK-SCHEDULE (ALL) SD_OTAIR_% ..
SW_off    =WEEK-SCHEDULE (ALL) SD_OFF    ..
SW_OA%_SM =WEEK-SCHEDULE (ALL) SD_OA%_WT  ..
SW_SM_HT  =WEEK-SCHEDULE (ALL) SD_SM_HT  ..
SW_WT_CL  =WEEK-SCHEDULE (ALL) SD_WT_CL  ..

```

```

S_FULL_ON =SCHEDULE THRU DEC 31 SW_FULL_ON ..
S_FULL_OFF =SCHEDULE THRU DEC 31 SW_off  ..
S_HEAT_SET =SCHEDULE THRU MAY 15 SW_WT_HT
              THRU OCT  1 SW_SM_HT
              THRU DEC 31 SW_WT_HT  ..

```

```

$ OUTSIDE_AIR_0.07%
S_OTSIDAIR =SCHEDULE THRU DEC 31 SW_OTAIR_% ..

```

```

S_HE_SCHED =SCHEDULE THRU MAY 15 SW_FULL_ON
              THRU OCT  1 SW_off
              THRU DEC 31 SW_FULL_ON  ..

```

```

S_CL_SCHED =SCHEDULE THRU MAY 15 SW_off
              THRU OCT  1 SW_FULL_ON
              THRU DEC 31 SW_off  ..

```

```

$ %OA_WINTER_%OA_SUM
S_OA_S_VNT =SCHEDULE THRU MAY 15 SW_OA%_SM
              THRU OCT  1 SW_FULL_ON
              THRU DEC 31 SW_OA%_SM  ..

```

```

S_HRLY-RPT =SCHEDULE THRU JAN 13 SW_off
              THRU JAN 15 SW_FULL_ON
              THRU AUG 20 SW_off
              THRU AUG 21 SW_FULL_ON
              THRU AUG 22 SW_off
              THRU AUG 23 SW_FULL_ON
              THRU DEC 31 SW_off  ..

```

```

S_COOL_SET =SCHEDULE THRU MAY 15 SW_WT_CL
              THRU OCT  1 SW_SM_CL
              THRU DEC 31 SW_WT_CL  ..

```

\$ ZONE DESCRIPTION

1ST\_COMPNY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS RATED-CFM = 3600.0  
HEATING-CAPACITY = -68484.0  
COOLING-CAPACITY = 68484.0 COOL-SH-CAP = 57094.0 ..

1ARMS-VALT =ZONE DESIGN-HEAT-T = 68.0 DESIGN-COOL-T = 80.0  
ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

1EQUPMAIN =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS RATED-CFM = 2400.0  
HEATING-CAPACITY = -45000.0 ..

2-COMPNY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS RATED-CFM = 3600.0  
HEATING-CAPACITY = -68484.0  
COOLING-CAPACITY = 68484.0 COOL-SH-CAP = 57094.0 ..

2-VALT =ZONE DESIGN-HEAT-T = 68.0 DESIGN-COOL-T = 80.0  
ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

2-EQUPMAN =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS RATED-CFM = 2400.0  
HEATING-CAPACITY = -45000.0 ..

5TH\_COMPNY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS RATED-CFM = 3600.0  
HEATING-CAPACITY = -68484.0  
COOLING-CAPACITY = 68484.0 COOL-SH-CAP = 57094.0 ..

5-VALT =ZONE DESIGN-HEAT-T = 68.0 DESIGN-COOL-T = 80.0  
ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

5EQUPMAIN =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS RATED-CFM = 2400.0  
HEATING-CAPACITY = -45000.0 ..

3-COMPNY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET

ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS RATED-CFM = 3600.0  
 HEATING-CAPACITY = -68484.0  
 COOLING-CAPACITY = 68484.0 COOL-SH-CAP = 57094.0 ..

3-VALT =ZONE DESIGN-HEAT-T = 68.0 DESIGN-COOL-T = 80.0  
 ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

3-EQUPMAN =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS RATED-CFM = 2400.0  
 HEATING-CAPACITY = -45000.0 ..

4-COMPNY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS RATED-CFM = 3600.0  
 HEATING-CAPACITY = -68484.0  
 COOLING-CAPACITY = 68484.0 COOL-SH-CAP = 57094.0 ..

4-VALT =ZONE DESIGN-HEAT-T = 68.0 DESIGN-COOL-T = 80.0  
 ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

4-EQUPMAN =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HEAT\_SET COOL-TEMP-SCH = S\_COOL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS RATED-CFM = 2400.0  
 HEATING-CAPACITY = -45000.0 ..

#### \$ SYSTEM DESCRIPTION

2\_PIP\_F.C. =SYSTEM SYSTEM-TYPE = TPFC  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 50.0  
 HEATING-SCHEDULE = S\_HE\_SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED RATED-CFM = 18000.  
 MIN-OUTSIDE-AIR = 0.07 SUPPLY-DELTA-T = 0.2  
 SUPPLY-KW = 0.00007 NIGHT-CYCLE-CTRL = STAY-OFF  
 COOLING-CAPACITY = 342420. COOL-SH-CAP = 285470.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -1027260.  
 ZONE-NAMES = (1ST\_COMPNY, 1ARMS-VALT, 2-COMPNY,  
 2-VALT, 5TH\_COMPNY, 5-VALT, 3-COMPNY,  
 3-VALT, 4-COMPNY, 4-VALT) ..

H&V =SYSTEM SYSTEM-TYPE = HVSYS  
 MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S\_HE\_SCHED  
 OA-CONTROL = FIXED SUPPLY-CFM = 12000.  
 MIN-AIR-SCH = S\_OA\_S\_VNT SUPPLY-DELTA-T = 2.4  
 SUPPLY-KW = 0.00078  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0

HEATING-CAPACITY = -195000.

ZONE-NAMES = (1EQUPTMAIN, 2-EQUPTMAN, 5EQUPTMAIN,  
3-EQUPTMAN, 4-EQUPTMAN) ..

## \$ HOURLY REPORT DESCRIPTION

FC\_BLOCK =REPORT-BLOCK VARIABLE-TYPE = 2\_PIP\_F.C.  
VARIABLE-LIST = (3,5,6,17) ..  
H&V\_BLOCK =REPORT-BLOCK VARIABLE-TYPE = H&V  
VARIABLE-LIST = (3,5,6,17,22) ..  
OFFIC-BLK =REPORT-BLOCK VARIABLE-TYPE = 1ST\_COMPNY  
VARIABLE-LIST = (17,18,7,6) ..  
MAIN\_BLOCK =REPORT-BLOCK VARIABLE-TYPE = 1EQUPTMAIN  
VARIABLE-LIST = (17,18,7,6) ..  
AHU'S-RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
REPORT-BLOCK = (FC\_BLOCK,H&V\_BLOCK)  
..  
ZONE-HRLYS = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
REPORT-BLOCK = (OFFIC-BLK,MAIN\_BLOCK)  
..  
END ..  
COMPUTE SYSTEMS ..  
INPUT PLANT ..

\$-----\$  
\$ E Z - D O E P L A N T S I N P U T \$  
\$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*  
LINE-4 \*RUN #2 DDC CONTROL FOR BLDG. 8021 \*  
LINE-5 \*ADM. & SUPPORT BLDG \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
PLANT-REPORT VERIFICATION=(PV-A)  
SUMMARY=(PS-B,BEPS)  
HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_heaton =DAY-SCHEDULE (1,24) (1.) ..  
Pd\_heatoff =DAY-SCHEDULE (1,24) (0.) ..  
PD\_coolon =DAY-SCHEDULE (1,24) (1.) ..  
PD\_cooloff =DAY-SCHEDULE (1,24) (0.) ..

| EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 11: 0:59 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 8021 ADM. & SUPPORT BLDG                               |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR 2_PIP_F.C. TOPEKA, KS                                  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN  | 0.00000                     |                         |                      |                      | -29.066                     | 15                      | -6.F                 | -7.F                 | -127.838                                | 4297.                              | 19.586                          |
| FEB  | 0.00000                     |                         |                      |                      | -18.482                     | 3                       | -1.F                 | -2.F                 | -112.392                                | 3887.                              | 19.586                          |
| MAR  | 0.00000                     |                         |                      |                      | -10.596                     | 14                      | 15.F                 | 13.F                 | -98.073                                 | 4682.                              | 19.586                          |
| APR  | 0.00000                     |                         |                      |                      | -1.093                      | 5                       | 31.F                 | 28.F                 | -45.544                                 | 4289.                              | 19.586                          |
| MAY  | 21.31055                    | 16                      | 62.F                 | 59.F                 | -0.352                      | 3                       | 69.F                 | 63.F                 | -6.690                                  | 4297.                              | 19.586                          |
| JUN  | 50.54285                    | 28                      | 89.F                 | 76.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 4481.                              | 19.586                          |
| JUL  | 59.61588                    | 13                      | 90.F                 | 79.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 4104.                              | 19.586                          |
| AUG  | 64.02199                    | 23                      | 94.F                 | 77.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 4682.                              | 19.586                          |
| SEP  | 39.25426                    | 7                       | 92.F                 | 76.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 4289.                              | 19.586                          |
| OCT  | 0.43014                     | 1                       | 82.F                 | 67.F                 | -1.053                      | 31                      | 44.F                 | 39.F                 | -37.126                                 | 4104.                              | 19.586                          |
| NOV  | 0.00000                     |                         |                      |                      | -7.809                      | 2                       | 15.F                 | 14.F                 | -82.734                                 | 4096.                              | 19.586                          |
| DEC  | 0.00000                     |                         |                      |                      | -25.721                     | 12                      | 3.F                  | 2.F                  | -120.030                                | 4297.                              | 19.586                          |
| TOTAL  | 235.175                     |                         |                      |                      | -94.173                     |                         |                      |                      | -127.838                                | 51502.                             | 19.586                          |
| MAX  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 11: 0:59 SDL RUN 1 |                          |                          |  |                   |                            |                            |                           |                           |                                      |  |  |
|--|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|---------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 8021 ADM. & SUPPORT BLDG                         |                          |                          |  |                   |                            |                            |                           |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOADS FOR 2_PIP_F.C. TOPEKA, KS                                    |                          |                          |  |                   |                            |                            |                           |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----  |                          |                          |  |                   |                            |                            |                           |                           |                                      |  |  |
| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN  | 0                        | 616                      | 0  | 128               | 744                        | 0                          | 744                       | 0                         | 128                                  | -2.504   | 0.344  |
| FEB  | 0                        | 522                      | 0  | 150               | 672                        | 0                          | 672                       | 0                         | 150                                  | -1.811   | 0.344  |
| MAR  | 0                        | 520                      | 0  | 224               | 744                        | 0                          | 744                       | 0                         | 224                                  | -4.553   | 0.344  |
| APR  | 0                        | 448                      | 0  | 272               | 720                        | 0                          | 720                       | 0                         | 272                                  | -1.913   | 0.344  |
| MAY  | 321                      | 227                      | 0  | 196               | 360                        | 384                        | 744                       | 0                         | 196                                  | 0.000  | 0.344  |
| JUN  | 667                      | 0                        | 0  | 53                | 0                          | 720                        | 720                       | 0                         | 53                                   | 0.000  | 19.586   |
| JUL  | 731                      | 0                        | 0  | 13                | 0                          | 744                        | 744                       | 0                         | 13                                   | 0.000  | 19.586   |
| AUG  | 731                      | 0                        | 0  | 13                | 0                          | 744                        | 744                       | 0                         | 13                                   | 0.000  | 19.586   |
| SEP  | 569                      | 0                        | 0  | 151               | 0                          | 720                        | 720                       | 0                         | 151                                  | 0.000  | 19.586   |
| OCT  | 14                       | 468                      | 0  | 262               | 0                          | 24                         | 744                       | 0                         | 262                                  | 0.000  | 0.344  |
| NOV  | 0                        | 503                      | 0  | 217               | 720                        | 0                          | 720                       | 0                         | 217                                  | -32.089  | 0.344  |
| DEC  | 0                        | 622                      | 0  | 122               | 744                        | 0                          | 744                       | 0                         | 122                                  | -78.018  | 0.344  |
| ANNUAL   | 3033                     | 3926                     | 0  | 1801              | 5424                       | 3336                       | 8760                      | 0                         | 1801                                 |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 11: 0:59 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 8021 ADM. & SUPPORT BLDG  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR H&V TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |   |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | MAXIMUM<br>ELEC-<br>TRICAL<br>ENERGY<br>(KWH) |
| JAN   | 0.00000                     |                         |                      |                      | -62.939                     | 16                      | 7                    | 12.F                 | 9.F                                     | 10994.  |
| FEB   | 0.00000                     |                         |                      |                      | -46.066                     | 3                       | 6                    | -1.F                 | -2.F                                    | 9936.   |
| MAR   | 0.00000                     |                         |                      |                      | -33.621                     | 3                       | 5                    | 15.F                 | 13.F                                    | 11378.  |
| APR   | 0.00000                     |                         |                      |                      | -8.261                      | 5                       | 6                    | 31.F                 | 28.F                                    | 10770.  |
| MAY   | 0.00000                     |                         |                      |                      | -0.503                      | 9                       | 6                    | 44.F                 | 44.F                                    | 10994.  |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 10961.  |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 10802.  |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 11378.  |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 10770.  |
| OCT   | 0.00000                     |                         |                      |                      | -4.339                      | 2                       | 2                    | 64.F                 | 59.F                                    | 10802.  |
| NOV   | 0.00000                     |                         |                      |                      | -22.721                     | 2                       | 6                    | 15.F                 | 14.F                                    | 10578.  |
| DEC   | 0.00000                     |                         |                      |                      | -53.870                     | 12                      | 6                    | 3.F                  | 2.F                                     | 10994.  |
| TOTAL | 0.000                       |                         |                      |                      | -232.320                    |                         |                      |                      |   | 130357.                                       |
| MAX   |                             |                         |                      |                      | 0.000                       |                         |                      |                      | -160.677                                | 28.552  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 11: 0:59 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 8021 ADM. & SUPPORT BLDG  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR H&V TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |                            |                   |                            |                            |                  |                           |                           |                                      | C O I N C I D E N T L O A D S                      |  |
|--------|---------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------|---------------------------|---------------------------|--------------------------------------|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON | HOURS<br>FANS ON<br>CYCLE | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 744              | 0                         | 0                         | 0                                    | -63.565  | 9.360  |
| FEB    | 0                         | 672                      | 0                          | 0                 | 672                        | 0                          | 744              | 0                         | 0                         | 0                                    | -63.217  | 9.360  |
| MAR    | 0                         | 715                      | 0                          | 29                | 744                        | 0                          | 744              | 0                         | 0                         | 29                                   | -61.544  | 9.360  |
| APR    | 0                         | 545                      | 0                          | 175               | 720                        | 0                          | 720              | 0                         | 0                         | 175                                  | -3.179   | 9.360  |
| MAY    | 0                         | 206                      | 0                          | 538               | 360                        | 0                          | 744              | 0                         | 0                         | 538                                  | 0.000  | 9.360  |
| JUN    | 0                         | 0                        | 0                          | 720               | 0                          | 0                          | 720              | 0                         | 0                         | 720                                  | 0.000  | 9.360  |
| JUL    | 0                         | 0                        | 0                          | 744               | 0                          | 0                          | 744              | 0                         | 0                         | 744                                  | 0.000  | 9.360  |
| AUG    | 0                         | 0                        | 0                          | 744               | 0                          | 0                          | 744              | 0                         | 0                         | 744                                  | 0.000  | 9.360  |
| SEP    | 0                         | 0                        | 0                          | 720               | 0                          | 0                          | 720              | 0                         | 0                         | 720                                  | 0.000  | 9.360  |
| OCT    | 0                         | 491                      | 0                          | 253               | 720                        | 0                          | 744              | 0                         | 0                         | 253                                  | -34.899  | 9.360  |
| NOV    | 0                         | 632                      | 0                          | 88                | 720                        | 0                          | 744              | 0                         | 0                         | 88                                   | -70.056  | 9.360  |
| DEC    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 744              | 0                         | 0                         | 0                                    | -92.145  | 9.360  |
| ANNUAL | 0                         | 4749                     | 0                          | 4011              | 5424                       | 0                          | 8760             | 0                         | 0                         | 4011                                 |  |  |



EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 11: 0:59 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 8021 ADM. & SUPPORT BLDG  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>56.551<br>170.629<br>31/10 | NATURAL-GAS<br>137.562<br>362.515<br>16/ 6 |
|-----|--|---|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 51.043<br>170.629<br>28/11                | 101.859<br>321.210<br>3/ 6                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 57.843<br>170.629<br>31/ 9                | 72.705<br>292.725<br>14/ 6                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.355<br>170.291<br>5/ 7                 | 18.426<br>175.358<br>5/ 6                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 56.847<br>181.470<br>31/16                | 51.790<br>353.541<br>16/ 2                 |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 62.553<br>181.470<br>30/16                | 117.237<br>366.755<br>24/13                |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 62.092<br>187.734<br>22/16                | 139.811<br>430.841<br>12/16                |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 66.065<br>187.734<br>24/16                | 147.056<br>422.275<br>23/14                |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 59.301<br>187.734<br>7/16                 | 91.043<br>416.121<br>7/16                  |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 51.667<br>168.870<br>31/ 7                | 12.828<br>148.896<br>31/ 6                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.450<br>170.629<br>28/ 8                | 52.216<br>241.486<br>2/ 6                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 56.413<br>170.629<br>30/16                | 122.153<br>341.914<br>12/ 6                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |   |  |
|     | ONE YEAR<br>USE/PEAK                             | 685.181<br>187.734                        | 1064.687<br>430.841                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 11: 0:59 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 8021 ADM. & SUPPORT BLDG  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 19.41       | 519.10      |
| SPACE COOL      | 37.57       | 545.58      |
| HVAC AUX        | 297.47      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 293.71      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 36.98       | 0.00        |
| TOTAL           | 685.15      | 1064.69     |

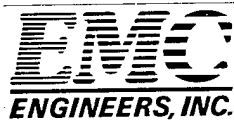
TOTAL SITE ENERGY 1749.87 MBTU 74.5 KBTU/SQFT-YR GROSS-AREA 84.1 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 3122.29 MBTU 132.9 KBTU/SQFT-YR GROSS-AREA 150.0 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 1.3  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



**COMPUTER ENERGY SIMULATIONS**

**BLDG. 406**

**ADMINISTRATION BLOCK-TYPE BUILDINGS**



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

BUILDING NO.: 406  
BLDG. TYPE: CID BUILDING

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

### ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3    | RUN4    | RUN5    |
|----------------|---------|---------|---------|---------|---------|---------|
| HEATING (MBtu) | 782.9   | 397.9   | 655.8   | 500.9   | 510.7   | 615.0   |
| COOLING (kWH)  | 153,012 | 129,127 | 146,185 | 128,731 | 166,742 | 149,367 |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 6,375 CFM                         |
| FLOOR AREA     | 4,644 FT <sup>2</sup>             |
| CFM/           | 1594 CFM                          |
| UA             | 2950 BTU/HR-°F                    |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

#### EZDOE COMPUTER RUN DEFINITION:

|         |                             |
|---------|-----------------------------|
| BASERUN | EXISTING OPERATION          |
| RUN1    | NIGHT SETBACK               |
| RUN2    | DDC CONTROL                 |
| RUN3    | ECONOMIZER                  |
| RUN4    | NIGHTTIME INFILTRATION (OA) |
| RUN5    | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      |            | ANNUAL HEATING & COOLING HOURS |            |
|--------------------|-------------------|------|------------|--------------------------------|------------|
| M-F                | 700               | 1700 | 50 HR      | HR. ON HEATING                 | 1621 HR/YR |
| SAT.               | 0                 | 0    | 0 HR       | HR. ON COOLING                 | 986 HR/YR  |
| SUN.               | 0                 | 0    | 0 HR       | HR. OFF HEATING                | 3827 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 50 HR/WK   | HR. OFF COOLING                | 2326 HR/YR |
|                    | TOTAL UNOCC. HR.  |      | 118 HR/WK  |                                |            |
|                    | ANNUAL OCCUPY HR. |      | 2607 HR/YR |                                |            |
|                    | ANNUAL UNOCC. HR. |      | 6153 HR/YR |                                |            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING

8760 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY

5448 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

3312 HR/YR

HRS SAVED (HTG ONLY)

5448

1621

=

3827 HR/YR

HRS SAVED (CLG ONLY)

3312

986

=

2326 HR/YR

|           |   |   |               |   |                     |
|-----------|---|---|---------------|---|---------------------|
| HOAUHC    | 782.87 MBtu   | - | 510.71 MBtu   | = | 2.78E+01 Btu/CFM-HR |
|           | 1593.75 CFM   | x | 6153 HR/YR    |   |                     |
| HOAUH     | 782.87 MBtu   | - | 510.71 MBtu   | = | 4.46E+01 Btu/CFM-HR |
|           | 1593.75 CFM   | x | 3827 HR/YR    |   |                     |
| COAUHC    | 153,012.0 kWH   | - | 166,741.9 kWH | = | 0.00E+00 kWH/CFM-HR |
|           | 1593.75 CFM   | x | 6153 HR/YR    |   |                     |
| COAUC     | 153,012.0 kWH   | - | 166,741.9 kWH | = | 0.00E+00 kWH/CFM-HR |
|           | 1593.75 CFM   | x | 2326 HR/YR    |   |                     |
| HOAOHC    | 782.87 MBtu   | - | 614.97 MBtu   | = | 4.04E+01 Btu/CFM-HR |
|           | 1593.75 CFM   | x | 2607 HR/YR    |   |                     |
| HOAOH     | 782.87 MBtu   | - | 614.97 MBtu   | = | 6.50E+01 Btu/CFM-HR |
|           | 1593.75 CFM   | x | 1621 HR/YR    |   |                     |
| COAOHC    | 153,012.0 kWH   | - | 149,367.1 kWH | = | 8.77E-04 kWH/CFM-HR |
|           | 1593.75 CFM   | x | 2607 HR/YR    |   |                     |
| COAOC     | 153,012.0 kWH   | - | 149,367.1 kWH | = | 2.32E-03 kWH/CFM-HR |
|           | 1593.75 CFM   | x | 986 HR/YR     |   |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | = | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | = | 0.17                |
| ECC       | 129,126.9 kWH   | - | 128,731.3 kWH | = | 6.29E-05 kWH/CFM-HR |
|           | 6375 CFM  | x | 986 HR/YR     |   |                     |
| ECHC      | 129,126.9 kWH   | - | 128,731.3 kWH | = | 2.38E-05 kWH/CFM-HR |
|           | 6375 CFM  | x | 2607 HR/YR    |   |                     |
| NSUCHC    | 153,012.0 kWH   | - | 129,126.9 kWH | = | 6.09E-04 kWH/CFM-HR |
|           | 6375 CFM  | x | 6153 HR/YR    |   |                     |
| NSUCC     | 153,012.0 kWH   | - | 129,126.9 kWH | = | 1.61E-03 kWH/CFM-HR |
|           | 6375 CFM  | x | 2326 HR/YR    |   |                     |
| DDCCHC    | 153,012.0 kWH   | - | 146,185.2 kWH | = | 4.11E-04 kWH/CFM-HR |
|           | 6375 CFM  | x | 2607 HR/YR    |   |                     |
| DDCCC     | 153,012.0 kWH   | - | 146,185.2 kWH | = | 1.09E-03 kWH/CFM-HR |
|           | 6375 CFM  | x | 986 HR/YR     |   |                     |
| NSC       | 782.87 MBtu   | - | 397.91 MBtu   | = | 1.31E+05 Btu/UA     |
|           | 2949.7362 UA  |   |               |   |                     |
| DDCH      | 782.87 MBtu   | - | 655.81 MBtu   | = | 4.31E+04 Btu/UA     |
|           | 2949.7362 UA  |   |               |   |                     |
| OPT       | (2 HR/DAY X 240 DAY/YR)                               | - | 175 HR/YR     | = | 305 HR/YR           |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               | = | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01          | = | 5.67 HR/YR          |



INPUT LOADS ..

```

$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE LINE-1 *      EMC      ENGINEERS      INC.      *
LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
LINE-3 *      DENVER,      CO      80227      *

```

LINE-4 \*BASELINE SIMULATION FOR BLDG #406 \*

LINE-5 \*CID BLDG \* ..

```

ABORT          ERRORS ..
DIAGNOSTIC     WARNINGS ..
LOADS-REPORT   VERIFICATION=(LV-D)
                SUMMARY=(LS-C,LS-D)
                HOURLY-DATA-SAVE = YES ..
BUILDING-LOCATION LATITUDE = 39.0
                LONGITUDE = 96.5
                ALTITUDE = 1065.
                TIME-ZONE = 6
                GROSS-AREA = 10219
                SHIELDING-COEF = 0.29
                X-REF = 0.0
                Y-REF = 0.0 ..
RUN-PERIOD     JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

LD\_ON =DAY-SCHEDULE (1,24) (1.) ..

LD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

```

LD_PEOPLE =DAY-SCHEDULE (1,6) (0.)
                (7) (0.5)
                (8,11) (1.)
                (12) (0.5)
                (13,17) (1.)
                (18,24) (0.) ..

```

```

LD_LIT/EQP =DAY-SCHEDULE (1,6) (0.1)
                (7) (0.5)
                (8,17) (1.)
                (18,24) (0.1) ..

```

LW\_ON =WEEK-SCHEDULE (ALL) LD\_ON ..

LW\_OFF =WEEK-SCHEDULE (ALL) LD\_OFF ..

LW\_PEOPLE =WEEK-SCHEDULE (WD) LD\_PEOPLE  
(WEH) LD\_OFF ..

LW\_LIT/EQP =WEEK-SCHEDULE (WD) LD\_LIT/EQP  
(WEH) LD\_OFF ..

## \$ ON 100% LOADS

L\_ON =SCHEDULE THRU DEC 31 LW\_ON ..

## \$ OFF 100% LOADS

L\_OFF =SCHEDULE THRU DEC 31 LW\_OFF ..

## \$ PEOPLE LOAD

L\_PEOPLE =SCHEDULE THRU DEC 31 LW\_PEOPLE ..

## \$ LIGHTS AND EQUIPMENT

L\_EQUI/LIG =SCHEDULE THRU DEC 31 LW\_LIT/EQP ..

## \$ CONSTRUCTION TYPES

## \$ SAND-BLOCK, AIRSPACE, GYP

EXWALL-1 =LAYERS MATERIAL=(CB17,CB07,AL21,GP01)  
THICKNESS=(1.000,0.500,0.000,0.042) ..  
EXWALL =CONSTRUCTION LAYERS = EXWALL-1  
ABSORPTANCE = 0.820  
ROUGHNESS = 2 ..

## \$ SLAB FLOOR

FLOOR =CONSTRUCTION U-VALUE = 0.020  
ABSORPTANCE = 0.610  
ROUGHNESS = 5 ..

## \$ STANDARD METAL DOOR

DOOR-STD =LAYERS MATERIAL=(WD01,IN31,WD01) I-F-R= 0.6100  
THICKNESS=(0.063,0.042,0.063) ..  
DOOR-WOD =CONSTRUCTION LAYERS = DOOR-STD  
ABSORPTANCE = 0.860  
ROUGHNESS = 5 ..

## \$ SHINGLED ROOF

ROOFMAIN =LAYERS MATERIAL=(AR02,PW05,IN02,HF-E1,HF-E4,AC02)  
THICKNESS=(0.000,0.063,0.296,0.063,0.000,0.042) ..  
MAINROOF =CONSTRUCTION LAYERS = ROOFMAIN  
ABSORPTANCE = 0.890 ..

## \$ BUILT-UP ROOF ON THE 1-STORY WING

ROOF-ADD =LAYERS MATERIAL=(RG02,IN23,HF-A3,HF-E4,AC02)  
THICKNESS=(0.083,0.167,0.005,0.000,0.042) ..  
ROOF-2 =CONSTRUCTION LAYERS = ROOF-ADD  
ABSORPTANCE = 0.870



ROUGHNESS = 1 ..

SG-PN-SW =GLASS-TYPE GLASS-TYPE-CODE = 2  
 PANES = 2 ..

## \$ SPACE DESCRIPTION

SPACE\_1 =SPACE AREA = 1856.0 VOLUME = 24128.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 319.3  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-KW = 3.73  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_EQUI/LIG  
 EQUIP-SCHEDULE = L\_EQUI/LIG EQUIPMENT-W/SQFT = 1.21  
 FURN-WEIGHT = 0.8 INF-METHOD = NONE ..

E-W HEIGHT = 15.0 WIDTH = 33.0 CONS = EXWALL  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 15.0 WIDTH = 53.5 CONS = EXWALL  
 AZIMUTH = 45 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 5.0 WIDTH = 3.0 G-T = SG-PN-SW  
 MULTIPLIER = 3.0 SETBACK = 0.8  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 30.  
 OVERHANG-D = 2.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-WOD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 15.0 WIDTH = 53.5 CONS = EXWALL  
 AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 5.0 WIDTH = 3.0 G-T = SG-PN-SW  
 MULTIPLIER = 4.0 SETBACK = 0.8  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 30.  
 OVERHANG-D = 2.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-WOD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 33.0 WIDTH = 58.0 CONS = ROOF-2  
 TILT = 0 SKY-FORM-FACTOR = 0.75  
 GND-FORM-FACTOR = 0.25 ..

U-W HEIGHT = 33.0 WIDTH = 58.0 CONS = FLOOR ..

SPACE\_2 =SPACE AREA = 1393.8 VOLUME = 48086.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 106.4  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-KW = 4.79  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_EQUI/LIG  
 EQUIP-SCHEDULE = L\_EQUI/LIG EQUIPMENT-W/SQFT = 3.63  
 FURN-WEIGHT = 0.8 INF-METHOD = NONE ..

E-W HEIGHT = 28.5 WIDTH = 77.0 CONS = EXWALL  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 5.0 WIDTH = 3.0 G-T = SG-PN-SW  
 MULTIPLIER = 10.0 SETBACK = 0.8  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 30.  
 OVERHANG-D = 2.5 ..

WINDOW HEIGHT = 5.0 WIDTH = 3.0 G-T = SG-PN-SW  
 MULTIPLIER = 2.0 SETBACK = 0.8  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 2. OVERHANG-B = 2. OVERHANG-W = 8.  
 OVERHANG-D = 2.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-WOD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 31.0 WIDTH = 19.5 CONS = EXWALL  
 AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 5.0 WIDTH = 3.0 G-T = SG-PN-SW  
 MULTIPLIER = 3.5 SETBACK = 0.8  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 30.  
 OVERHANG-D = 2.5 ..

E-W HEIGHT = 31.0 WIDTH = 19.5 CONS = EXWALL  
 AZIMUTH = 45 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 5.0 WIDTH = 3.0 G-T = SG-PN-SW  
 MULTIPLIER = 3.5 SETBACK = 0.8  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 30.  
 OVERHANG-D = 2.5 ..

ROOF HEIGHT = 17.2 WIDTH = 46.0 CONS = MAINROOF  
 AZIMUTH = 135 TILT = 32 SKY-FORM-FACTOR = 0.75  
 GND-FORM-FACTOR = 0.25 ..

ROOF HEIGHT = 30.0 WIDTH = 19.5 CONS = MAINROOF  
 AZIMUTH = 225 TILT = 37 SKY-FORM-FACTOR = 0.75  
 GND-FORM-FACTOR = 0.25 ..

ROOF HEIGHT = 30.0 WIDTH = 19.5 CONS = MAINROOF  
 AZIMUTH = 135 TILT = 37 SKY-FORM-FACTOR = 0.75  
 GND-FORM-FACTOR = 0.25 ..

U-W HEIGHT = 24.0 WIDTH = 88.0 CONS = FLOOR ..

SPACE\_3 =SPACE AREA = 1393.8 VOLUME = 48086.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 106.4  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-KW = 5.34  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_EQUI/LIG  
 EQUIP-SCHEDULE = L\_EQUI/LIG EQUIPMENT-W/SQFT = 3.63  
 FURN-WEIGHT = 0.8 INF-METHOD = NONE ..

E-W HEIGHT = 32.0 WIDTH = 84.0 CONS = EXWALL  
 AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 5.0 WIDTH = 3.0 G-T = SG-PN-SW  
 MULTIPLIER = 16.5 SETBACK = 0.8  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 30.  
 OVERHANG-D = 2.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-WOD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 31.0 WIDTH = 19.5 CONS = EXWALL  
 AZIMUTH = 45 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 5.0 WIDTH = 3.0 G-T = SG-PN-SW  
 MULTIPLIER = 3.0 SETBACK = 0.8  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 30.  
 OVERHANG-D = 2.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-WOD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 31.0 WIDTH = 19.5 CONS = EXWALL  
 AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 5.0 WIDTH = 3.0 G-T = SG-PN-SW  
 MULTIPLIER = 3.0 SETBACK = 0.8  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 30.  
 OVERHANG-D = 2.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-WOD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 17.2 WIDTH = 46.0 CONS = MAINROOF

AZIMUTH = 315 TILT = 32 SKY-FORM-FACTOR = 0.75  
GND-FORM-FACTOR = 0.25 ..

ROOF HEIGHT = 30.0 WIDTH = 19.5 CONS = MAINROOF  
AZIMUTH = 45 TILT = 37 SKY-FORM-FACTOR = 0.75  
GND-FORM-FACTOR = 0.25 ..

ROOF HEIGHT = 30.0 WIDTH = 19.5 CONS = MAINROOF  
AZIMUTH = 315 TILT = 37 SKY-FORM-FACTOR = 0.75  
GND-FORM-FACTOR = 0.25 ..

U-W HEIGHT = 24.0 WIDTH = 88.0 CONS = FLOOR ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
\$ E Z - D O E S Y S T E M S I N P U T \$  
\$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*BASELINE SIMULATION FOR BLDG #406 \*

LINE-5 \*CID BLDG \* ..

ABORT ERRORS ..

DIAGNOSTIC WARNINGS ..

SYSTEMS-REPORT VERIFICATION=(SV-A)

SUMMARY=(SS-A,SS-C,SS-K,SS-O)

HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..

SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

SD\_WT\_HT =DAY-SCHEDULE (1,24) (74.) ..

SD\_SM\_CL =DAY-SCHEDULE (1,24) (72.) ..

SD\_WT\_CL =DAY-SCHEDULE (1,24) (74.2) ..

SD\_SM\_HT =DAY-SCHEDULE (1,24) (71.8) ..

SD\_OA\_% =DAY-SCHEDULE (1,24) (0.25) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..

```

SW_WT_CL  =WEEK-SCHEDULE (ALL) SD_WT_CL  ..
SW_SM_HT  =WEEK-SCHEDULE (ALL) SD_SM_HT  ..
SW_OA_%   =WEEK-SCHEDULE (ALL) SD_OA_%   ..

```

## \$ FULL ON SYSTEM

```

S_ON      =SCHEDULE THRU DEC 31 SW_ON  ..

```

## \$ FULL OFF SYSTEM

```

S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..

```

## \$ HEATING SEASON

```

S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON  ..

```

## \$ COOLING SEASON

```

S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF ..

```

## \$ HEATING SET TEMP

```

S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
              THRU OCT  1 SW_SM_HT
              THRU DEC 31 SW_WT_HT ..

```

## \$ COOLING SET TEMP

```

S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
              THRU OCT  1 SW_SM_CL
              THRU DEC 31 SW_WT_CL ..

```

## \$ OUTSIDE AIR FRACTION

```

S_OA_%     =SCHEDULE THRU DEC 31 SW_OA_% ..

```

```

S_HRLY     =SCHEDULE THRU JAN 14 SW_OFF
              THRU JAN 15 SW_ON
              THRU AUG 21 SW_OFF
              THRU AUG 22 SW_ON
              THRU DEC 31 SW_OFF  ..

```

## \$ ZONE DESCRIPTION

```

SPACE_1    =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
                HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
                ZONE-TYPE = CONDITIONED
                THERMOSTAT-TYPE = PROPORTIONAL  THROTTLING-RANGE = 0.2
                SIZING-OPTION = FROM-LOADS  ..

```

```

SPACE_2    =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
                HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
                ZONE-TYPE = CONDITIONED
                THERMOSTAT-TYPE = PROPORTIONAL  THROTTLING-RANGE = 0.2

```

SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

# \$ SYSTEM DESCRIPTION

MZ\_W/\_DX =SYSTEM SYSTEM-TYPE = PMZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED OA-CONTROL = FIXED  
 SUPPLY-CFM = 6130. RATED-CFM = 6130.  
 MIN-OUTSIDE-AIR = 0.25 MIN-AIR-SCH = S\_OA\_%  
 MAX-OA-FRACTION = 0.25 FAN-SCHEDULE = S\_ON  
 SUPPLY-STATIC = 4.5 SUPPLY-EFF = 0.78  
 NIGHT-CYCLE-CTRL = STAY-OFF MIN-CFM-RATIO = 1.0  
 COOLING-CAPACITY = 217000. COOL-SH-CAP = 134000.  
 COIL-BF = 0.07 HEATING-CAPACITY = -520000.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER  
 ZONE-NAMES = (SPACE\_1, SPACE\_2, SPACE\_3) ..

# \$ HOURLY REPORT DESCRIPTION

AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = MZ\_W/\_DX  
 VARIABLE-LIST = (3,5,6,17,18,19) ..  
 ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = SPACE\_2  
 VARIABLE-LIST = (17,18,7,6) ..  
 AHU-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY  
 REPORT-BLOCK = (AHU-BLOCK)  
 ..  
 ZONE-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY  
 REPORT-BLOCK = (ZONE-BLOCK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*BASELINE SIMULATION FOR BLDG #406 \*

LINE-5 \*CID BLDG

\* ..

ABORT                ERRORS ..  
DIAGNOSTIC           WARNINGS ..  
PLANT-REPORT        VERIFICATION=(PV-A)  
                     SUMMARY=(PS-B,BEPS)  
                     HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_ON        =DAY-SCHEDULE (1,24) (1.) ..

PD\_OFF       =DAY-SCHEDULE (1,24) (0.) ..

PW\_OFF       =WEEK-SCHEDULE (ALL) PD\_OFF ..

PW\_ON        =WEEK-SCHEDULE (ALL) PD\_ON ..

## \$ HEATING SEASON

P\_HEAT       =SCHEDULE THRU MAY 15 PW\_ON  
                     THRU OCT 1 PW\_OFF  
                     THRU DEC 31 PW\_ON ..

## \$ COOLING SEASON

P\_COOL       =SCHEDULE THRU MAY 15 PW\_OFF  
                     THRU OCT 1 PW\_ON  
                     THRU DEC 31 PW\_OFF ..

## \$ EQUIPMENT DESCRIPTION

BOILER-STM =PLANT-EQUIPMENT    TYPE = STM-BOILER  
                     SIZE = -999. ..

DX-CHILLER =PLANT-EQUIPMENT    TYPE = HERM-REC-CHLR  
                     SIZE = -999. ..

PLANT-PARAMETERS        BOILER-FUEL = NATURAL-GAS    HERM-REC-COND-TYPE = AIR  
                         CCIRC-HEAD = 0.0    HCIRC-HEAD = 0.0    ..

ENERGY-RESOURCE        RESOURCE = ELECTRICITY ..  
ENERGY-RESOURCE        RESOURCE = NATURAL-GAS ..

HEAT-SEASO =LOAD-ASSIGNMENT    TYPE = HEATING  
                             OPERATION-MODE = RUN-NEEDED

LOAD-RANGE =        0.000  
PLANT-EQUIPMENT = BOILER-STM  
NUMBER =        1 ..

COOL-SEASO =LOAD-ASSIGNMENT    TYPE = COOLING  
                             OPERATION-MODE = RUN-NEEDED

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LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = DX-CHILLER  
NUMBER = 1 ..

END ..  
COMPUTE PLANT ..  
STOP ..



| EMC ENGINEERS INC.<br>DENVER, CO 80227   |       | EZDOE - ELITE SOFTWARE DEVELOPMENT INC<br>BASELINE SIMULATION FOR BLDG #406 |                         | DOE-2.1D 5/ 5/1995         |                        | 14:37:58                   |                         | LDL RUN 1                  |                        |
|--|-------|---|-------------------------|----------------------------|------------------------|----------------------------|-------------------------|----------------------------|------------------------|
| REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT                       |       | CID BLDG  |                         | TOPEKA, KS                 |                        |                            |                         |                            |                        |
| NUMBER OF EXTERIOR SURFACES 16   |       | RECTANGULAR 16  |                         | OTHER 0                    |                        |                            |                         |                            |                        |
| (U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED ) |       |   |                         |                            |                        |                            |                         |                            |                        |
| SURFACE  | SPACE | U-VALUE<br>(BTU/HR-SQFT-F)  | GLASS<br>AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | WALL<br>AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | WALL<br>AREA<br>(SQFT) |
| SPACE_1  |       | 0.490   | 45.00                   | 0.237                      | 757.50                 | 0.251                      | 802.50                  |                            | NORTH-EAST             |
| SPACE_2  |       | 0.490   | 52.50                   | 0.237                      | 552.00                 | 0.259                      | 604.50                  |                            | NORTH-EAST             |
| SPACE_3  |       | 0.490   | 45.00                   | 0.237                      | 559.50                 | 0.256                      | 604.50                  |                            | NORTH-EAST             |
| SPACE_1  |       | 0.000   | 0.00                    | 0.237                      | 495.00                 | 0.237                      | 495.00                  |                            | SOUTH-EAST             |
| SPACE_2  |       | 0.490   | 180.00                  | 0.237                      | 2014.50                | 0.258                      | 2194.50                 |                            | SOUTH-EAST             |
| SPACE_1  |       | 0.490   | 60.00                   | 0.237                      | 742.50                 | 0.256                      | 802.50                  |                            | SOUTH-WEST             |
| SPACE_2  |       | 0.490   | 52.50                   | 0.237                      | 552.00                 | 0.259                      | 604.50                  |                            | SOUTH-WEST             |
| SPACE_3  |       | 0.490   | 45.00                   | 0.237                      | 559.50                 | 0.256                      | 604.50                  |                            | SOUTH-WEST             |
| SPACE_3  |       | 0.490   | 247.50                  | 0.237                      | 2440.50                | 0.260                      | 2688.00                 |                            | NORTH-WEST             |
| SPACE_2  |       | 0.000   | 0.00                    | 0.060                      | 585.00                 | 0.060                      | 585.00                  |                            | ROOF                   |
| SPACE_1  |       | 0.000   | 0.00                    | 0.098                      | 1914.00                | 0.098                      | 1914.00                 |                            | ROOF                   |
| SPACE_2  |       | 0.000   | 0.00                    | 0.060                      | 791.20                 | 0.060                      | 791.20                  |                            | ROOF                   |
| SPACE_2  |       | 0.000   | 0.00                    | 0.060                      | 585.00                 | 0.060                      | 585.00                  |                            | ROOF                   |
| SPACE_3  |       | 0.000   | 0.00                    | 0.060                      | 791.20                 | 0.060                      | 791.20                  |                            | ROOF                   |
| SPACE_3  |       | 0.000   | 0.00                    | 0.060                      | 585.00                 | 0.060                      | 585.00                  |                            | ROOF                   |
| SPACE_3  |       | 0.000   | 0.00                    | 0.060                      | 585.00                 | 0.060                      | 585.00                  |                            | ROOF                   |
| SPACE_1  |       | 0.000   | 0.00                    | 0.020                      | 1914.00                | 0.020                      | 1914.00                 |                            | UNDERGRND              |
| SPACE_2  |       | 0.000   | 0.00                    | 0.020                      | 2112.00                | 0.020                      | 2112.00                 |                            | UNDERGRND              |
| SPACE_3  |       | 0.000   | 0.00                    | 0.020                      | 2112.00                | 0.020                      | 2112.00                 |                            | UNDERGRND              |

| EMC ENGINEERS INC.<br>DENVER, CO 80227                   |  | EZDOE - ELITE SOFTWARE DEVELOPMENT INC<br>BASELINE SIMULATION FOR BLDG #406 |       | DOE-2.1D 5/ 5/1995                          |        | 14:37:58                |          | LDL RUN 1                |  |
|--|--|---|-------|---|--------|-------------------------|----------|--------------------------|--|
| REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT |  | CID BLDG  |       | TOPEKA, KS                                  |        |                         |          |                          |  |
| NORTH-EAST   |  | AVERAGE<br>U-VALUE/GLASS<br>(BTU/HR-SQFT-F)                                 |       | AVERAGE<br>U-VALUE/WALLS<br>(BTU/HR-SQFT-F) |        | GLASS<br>AREA<br>(SQFT) |          | OPAQUE<br>AREA<br>(SQFT) |  |
|  |  | 0.490   | 0.237 | 0.255                                       | 142.50 | 1869.00                 | 2011.50  |                          |  |
| SOUTH-EAST   |  | 0.490   | 0.237 | 0.254                                       | 180.00 | 2509.50                 | 2689.50  |                          |  |
| SOUTH-WEST   |  | 0.490   | 0.237 | 0.257                                       | 157.50 | 1854.00                 | 2011.50  |                          |  |
| NORTH-WEST   |  | 0.490   | 0.237 | 0.260                                       | 247.50 | 2440.50                 | 2688.00  |                          |  |
| ROOF   |  | 0.000   | 0.073 | 0.073                                       | 0.00   | 5836.40                 | 5836.40  |                          |  |
| ALL WALLS  |  | 0.490   | 0.237 | 0.257                                       | 727.50 | 8673.00                 | 9400.50  |                          |  |
| WALLS+ROOFS  |  | 0.490   | 0.171 | 0.186                                       | 727.50 | 14509.40                | 15236.90 |                          |  |
| UNDERGRND  |  | 0.000   | 0.020 | 0.020                                       | 0.00   | 6138.00                 | 6138.00  |                          |  |
| BUILDING   |  | 0.490   | 0.126 | 0.138                                       | 727.50 | 20647.40                | 21374.90 |                          |  |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 14:37:58 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #406 CID BLDG  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ\_W/\_DX TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      |                             | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G           |                      |                      |                                    |                                 | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C |  |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|---|-------------------------|----------------------|----------------------|------------------------------------|---------------------------------|---|---------|--|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) |   | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |   |         |  |
| JAN   | 0.00000                     |                         |                      |                      | -125.109                    | 15                                      | -6.0                    | -7.0                 | -319.861             | 9589.                              | 30.465                          |   |         |  |
| FEB   | 0.00000                     |                         |                      |                      | -92.922                     | 3                                       | -1.0                    | -2.0                 | -272.156             | 8667.                              | 30.465                          |   |         |  |
| MAR   | 0.00000                     |                         |                      |                      | -69.375                     | 4                                       | 14.0                    | 12.0                 | -219.964             | 10203.                             | 30.365                          |   |         |  |
| APR   | 0.00000                     |                         |                      |                      | -22.387                     | 1                                       | 32.0                    | 29.0                 | -145.275             | 9484.                              | 30.365                          |   |         |  |
| MAY   | 22.73035                    | 31                      | 88.0                 | 75.0                 | -4.692                      | 1                                       | 38.0                    | 36.0                 | -91.021              | 11735.                             | 49.140                          |   |         |  |
| JUN   | 71.02290                    | 30                      | 82.0                 | 75.0                 | 0.000                       |   |                         |                      | 0.000                | 16509.                             | 49.063                          |   |         |  |
| JUL   | 92.81859                    | 1                       | 86.0                 | 80.0                 | 0.000                       |   |                         |                      | 0.000                | 18099.                             | 50.182                          |   |         |  |
| AUG   | 91.01701                    | 23                      | 93.0                 | 77.0                 | 0.000                       |   |                         |                      | 0.000                | 19150.                             | 50.394                          |   |         |  |
| SEP   | 43.21564                    | 1                       | 78.0                 | 73.0                 | 0.000                       |   |                         |                      | 0.000                | 13597.                             | 49.619                          |   |         |  |
| OCT   | 0.00000                     |                         |                      |                      | -20.038                     | 20                                      | 24.0                    | 23.0                 | -146.760             | 9275.                              | 30.365                          |   |         |  |
| NOV   | 0.00000                     |                         |                      |                      | -59.799                     | 3                                       | 13.0                    | 12.0                 | -209.583             | 9175.                              | 30.365                          |   |         |  |
| DEC   | 0.00000                     |                         |                      |                      | -111.451                    | 13                                      | 2.0                     | 1.0                  | -277.072             | 9584.                              | 30.465                          |   |         |  |
| TOTAL | 320.805                     |                         |                      |                      | -505.770                    |   |                         |                      |                      | 145063.                            |                                 |   |         |  |
| MAX   |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |
|       |                             |                         |                      |                      |                             |   |                         |                      |                      |                                    |                                 |   |         |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 14:37:58 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #406 CID BLDG  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ\_W/\_DX TOPEKA, KS

| N U M B E R O F H O U R S |                          |                          |  |                   |                            |                            |                  |                           |                           |                                      |  |  | --COINCIDENT LOADS-- |  |
|---------------------------|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------|---------------------------|---------------------------|--------------------------------------|--|--|----------------------|--|
| MONTH                     | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON | HOURS<br>FANS<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |                      |  |
| JAN                       | 0                        | 744                      | 0  | 0                 | 744                        | 0                          | 744              | 0                         | 0                         | 0                                    | -155.612   | 6.772  |                      |  |
| FEB                       | 0                        | 672                      | 0  | 0                 | 672                        | 0                          | 672              | 0                         | 0                         | 0                                    | -149.009   | 6.772  |                      |  |
| MAR                       | 0                        | 744                      | 0  | 0                 | 744                        | 0                          | 744              | 0                         | 0                         | 0                                    | -143.778   | 6.772  |                      |  |
| APR                       | 0                        | 720                      | 0  | 0                 | 720                        | 0                          | 720              | 0                         | 0                         | 0                                    | -52.678  | 4.151  |                      |  |
| MAY                       | 272                      | 360                      | 0  | 112               | 360                        | 384                        | 744              | 0                         | 0                         | 112                                  | 0.000  | 49.140   |                      |  |
| JUN                       | 647                      | 0                        | 0  | 73                | 0                          | 720                        | 720              | 0                         | 0                         | 73                                   | 0.000  | 48.602   |                      |  |
| JUL                       | 734                      | 0                        | 0  | 10                | 0                          | 744                        | 744              | 0                         | 0                         | 10                                   | 0.000  | 50.182   |                      |  |
| AUG                       | 723                      | 0                        | 0  | 21                | 0                          | 744                        | 744              | 0                         | 0                         | 21                                   | 0.000  | 50.325   |                      |  |
| SEP                       | 458                      | 0                        | 0  | 262               | 0                          | 720                        | 720              | 0                         | 0                         | 262                                  | 0.000  | 47.916   |                      |  |
| OCT                       | 0                        | 720                      | 0  | 24                | 720                        | 24                         | 744              | 0                         | 0                         | 24                                   | -92.602  | 6.772  |                      |  |
| NOV                       | 0                        | 720                      | 0  | 0                 | 720                        | 0                          | 720              | 0                         | 0                         | 0                                    | -160.730   | 6.772  |                      |  |
| DEC                       | 0                        | 744                      | 0  | 0                 | 744                        | 0                          | 744              | 0                         | 0                         | 0                                    | -205.376   | 4.151  |                      |  |
| ANNUAL                    | 2834                     | 5424                     | 0  | 502               | 5424                       | 3336                       | 8760             | 0                         | 0                         | 502                                  |  |  |                      |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC CID BLDG TOPEKA, KS  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #406  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE

DOE-2.1D 5/ 5/1995 14:37:58 PDL RUN 1

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>37.856<br>111.127<br>28/ 9 | NATURAL-GAS<br>182.168<br>419.978<br>15/ 8 |
|-----|--|---|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.856<br>111.127<br>28/ 9                | 182.168<br>419.978<br>15/ 8                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 34.153<br>111.127<br>3/ 8                 | 140.576<br>367.279<br>3/ 6                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 39.032<br>110.785<br>31/10                | 110.381<br>307.958<br>4/ 6                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 34.319<br>110.462<br>5/ 8                 | 40.701<br>220.040<br>1/ 1                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 40.580<br>167.783<br>31/16                | 9.913<br>153.943<br>1/ 7                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 56.367<br>167.522<br>27/15                | 0.000<br>0.000<br>30/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 61.796<br>171.342<br>1/16                 | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 65.386<br>172.066<br>22/13                | 0.000<br>0.000<br>31/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 46.425<br>169.419<br>7/15                 | 0.000<br>0.000<br>30/ 1                    |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.514<br>110.785<br>20/ 9                | 37.335<br>221.823<br>20/ 6                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 35.036<br>110.785<br>30/12                | 96.006<br>295.951<br>3/ 6                  |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.773<br>111.127<br>13/ 8                | 165.790<br>372.776<br>13/ 6                |
|     | ONE YEAR<br>USE/PEAK                             | 522.237<br>172.066                        | 782.871<br>419.978                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 14:37:58 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #406 CID BLDG  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 26.92       | 782.87      |
| SPACE COOL      | 105.01      | 0.00        |
| HVAC AUX        | 124.15      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 140.66      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 125.49      | 0.00        |
| TOTAL           | 522.23      | 782.87      |

TOTAL SITE ENERGY 1305.11 MBTU 127.7 KBTU/SQFT-YR GROSS-AREA 281.1 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2351.15 MBTU 230.1 KBTU/SQFT-YR GROSS-AREA 506.3 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 3.6  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



AZIMUTH = 315 TILT = 32 SKY-FORM-FACTOR = 0.75  
GND-FORM-FACTOR = 0.25 ..

ROOF HEIGHT = 30.0 WIDTH = 19.5 CONS = MAINROOF  
AZIMUTH = 45 TILT = 37 SKY-FORM-FACTOR = 0.75  
GND-FORM-FACTOR = 0.25 ..

ROOF HEIGHT = 30.0 WIDTH = 19.5 CONS = MAINROOF  
AZIMUTH = 315 TILT = 37 SKY-FORM-FACTOR = 0.75  
GND-FORM-FACTOR = 0.25 ..

U-W HEIGHT = 24.0 WIDTH = 88.0 CONS = FLOOR ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
\$ E Z - D O E S Y S T E M S I N P U T \$  
\$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #1 NIGHT SET BACK FOR BLDG #406 \*

LINE-5 \*CID BLDG \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
SYSTEMS-REPORT VERIFICATION=(SV-A)  
SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
HOURLY-DATA-SAVE = YES ..

# \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
SD\_WT\_HT =DAY-SCHEDULE (1,6) (55.)  
(7,17) (74.)  
(18,24) (55.) ..  
SD\_SM\_CL =DAY-SCHEDULE (1,6) (85.)  
(7,17) (72.)  
(18,24) (85.) ..  
SD\_WT\_CL =DAY-SCHEDULE (1,6) (58.)  
(7,17) (76.)  
(18,24) (58.) ..  
SD\_SM\_HT =DAY-SCHEDULE (1,6) (83.)  
(7,17) (70.)  
(18,24) (83.) ..  
SD\_OA\_# =DAY-SCHEDULE (1,24) (0.25) ..  
SD\_FAN\_CYC =DAY-SCHEDULE (1,6) (0.)

```

(7,17) (1.)
(18,24) (0.) ..
SD_WT_HT_D =DAY-SCHEDULE (1,24) (55.) ..
SD_SM_CL_D =DAY-SCHEDULE (1,24) (85.) ..
SD_WT_CL_D =DAY-SCHEDULE (1,24) (57.) ..
SD_SM_HT_D =DAY-SCHEDULE (1,24) (83.) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON  ..

SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT   =WEEK-SCHEDULE (WD) SD_WT_HT
              (WEH) SD_WT_HT_D ..

SW_SM_CL   =WEEK-SCHEDULE (WD) SD_SM_CL
              (WEH) SD_SM_CL_D ..

SW_WT_CL   =WEEK-SCHEDULE (WD) SD_WT_CL
              (WEH) SD_WT_CL_D ..

SW_SM_HT   =WEEK-SCHEDULE (WD) SD_SM_HT
              (WEH) SD_SM_HT_D ..

SW_OA_%    =WEEK-SCHEDULE (ALL) SD_OA_% ..

SW_FAN_CYC =WEEK-SCHEDULE (WD) SD_FAN_CYC
              (WEH) SD_OFF  ..

$ FULL ON SYSTEM
S_ON      =SCHEDULE THRU DEC 31 SW_ON  ..

$ FULL OFF SYSTEM
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..

$ HEATING SEASON
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON  ..

$ COOLING SEASON
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF ..

$ HEATING SET TEMP
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
              THRU OCT  1 SW_SM_HT
              THRU DEC 31 SW_WT_HT ..

$ COOLING SET TEMP
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
              THRU OCT  1 SW_SM_CL
              THRU DEC 31 SW_WT_CL ..

$ OUTSIDE AIR FRACTION

```



S\_OA\_% =SCHEDULE THRU DEC 31 SW\_OA\_% ..

S\_HRLY =SCHEDULE THRU JAN 14 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU JAN 16 SW\_OFF  
 THRU JAN 17 SW\_ON  
 THRU AUG 20 SW\_OFF  
 THRU AUG 22 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

#### \$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

#### \$ SYSTEM DESCRIPTION

MZ\_W/\_DX =SYSTEM SYSTEM-TYPE = PMZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED  
 HEAT-CONTROL = COLDEST COOL-CONTROL = WARMEST  
 OA-CONTROL = FIXED SUPPLY-CFM = 6130.  
 RATED-CFM = 6130. MIN-OUTSIDE-AIR = 0.25  
 MIN-AIR-SCH = S\_OA\_% MAX-OA-FRACTION = 0.25  
 FAN-SCHEDULE = S\_FAN\_CYC SUPPLY-STATIC = 4.5  
 SUPPLY-EFF = 0.78 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY ←  
 MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 217000.  
 COOL-SH-CAP = 134000. COIL-BF = 0.07  
 HEATING-CAPACITY = -520000. CRANKCASE-MAX-T = 0.  
 OUTSIDE-FAN-T = 45. HEAT-SOURCE = HOT-WATER  
 ZONE-NAMES = (SPACE\_1, SPACE\_2, SPACE\_3) ..

#### \$ HOURLY REPORT DESCRIPTION

```

AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = MZ_W/_DX
              VARIABLE-LIST = (3,5,6,17,18,19) ..
ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = SPACE_2
              VARIABLE-LIST = (17,18,7,31) ..
AHU-HRLY   = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY
              REPORT-BLOCK = (AHU-BLOCK)
..
ZONE-HRLY  = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY
              REPORT-BLOCK = (ZONE-BLOCK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #1 NIGHT SET BACK FOR BLDG #406      *
        LINE-5 *CID BLDG                                * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC WARNINGS ..
PLANT-REPORT VERIFICATION=(PV-A)
              SUMMARY=(PS-B,BEPS)
              HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON      =DAY-SCHEDULE (1,24) (1.) ..

PD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

PW_OFF     =WEEK-SCHEDULE (ALL) PD_OFF ..

PW_ON      =WEEK-SCHEDULE (ALL) PD_ON ..

```

## \$ HEATING SEASON

```

P_HEAT     =SCHEDULE THRU MAY 15 PW_ON
              THRU OCT  1 PW_OFF
              THRU DEC 31 PW_ON ..

```

## \$ COOLING SEASON

```

P_COOL     =SCHEDULE THRU MAY 15 PW_OFF
              THRU OCT  1 PW_ON
              THRU DEC 31 PW_OFF ..

```

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 8:55:28 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|---|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 RUN #1 NIGHT SET BACK FOR BLDG #406 CID BLDG TOPEKA, KS                      |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ_W/_DX  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----                                   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| MONTH   | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -68.448                     | 28                      | -1.1.F               | -3.1.F               | -404.079                                | 8684.                              | 30.465                          |
| FEB   | 0.00000                     |                         |                      |                      | -46.951                     | 3                       | -5.1.F               | -6.1.F               | -381.993                                | 7920.                              | 30.465                          |
| MAR   | 0.00000                     |                         |                      |                      | -31.893                     | 14                      | 16.1.F               | 14.1.F               | -342.696                                | 9713.                              | 30.365                          |
| APR   | 0.00000                     |                         |                      |                      | -6.659                      | 5                       | 30.1.F               | 27.1.F               | -203.601                                | 9430.                              | 30.365                          |
| MAY   | 15.61987                    | 31                      | 16                   | 88.F 75.F            | -1.042                      | 9                       | 43.1.F               | 43.1.F               | -134.071                                | 11011.                             | 49.305                          |
| JUN   | 40.18599                    | 30                      | 10                   | 82.F 75.F            | 0.000                       |                         |                      |                      | 0.000                                   | 13106.                             | 49.383                          |
| JUL   | 43.89425                    | 1                       | 16                   | 86.F 80.F            | 0.000                       |                         |                      |                      | 0.000                                   | 12237.                             | 50.447                          |
| AUG   | 48.86752                    | 23                      | 13                   | 93.F 77.F            | 0.000                       |                         |                      |                      | 0.000                                   | 13919.                             | 50.752                          |
| SEP   | 27.80221                    | 1                       | 13                   | 78.F 73.F            | 0.000                       |                         |                      |                      | 0.000                                   | 11944.                             | 49.894                          |
| OCT   | 0.00000                     |                         |                      |                      | -5.617                      | 20                      | 23.1.F               | 23.1.F               | -209.355                                | 9242.                              | 30.365                          |
| NOV   | 0.00000                     |                         |                      |                      | -23.700                     | 14                      | 32.1.F               | 32.1.F               | -299.824                                | 8640.                              | 30.365                          |
| DEC   | 0.00000                     |                         |                      |                      | -57.670                     | 12                      | 2.1.F                | 1.1.F                | -401.139                                | 8717.                              | 30.465                          |
| TOTAL   | 176.370                     |                         |                      |                      | -241.981                    |                         |                      |                      | -404.079                                | 124564.                            | 50.752                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      | 206.404                                 |                                    |                                 |

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 8:55:28 SDL RUN 1 |  |         |  |         |  |         |  |          |  |                    |  |
|---|--|---------|--|---------|--|---------|--|----------|--|--------------------|--|
| DENVER, CO 80227 RUN #1 NIGHT SET BACK FOR BLDG #406 CID BLDG TOPEKA, KS                      |  |         |  |         |  |         |  |          |  |                    |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ_W/_DX   |  |         |  |         |  |         |  |          |  |                    |  |
| ----- N U M B E R O F H O U R S -----   |  |         |  |         |  |         |  |          |  |                    |  |
| HOURS   |  | HOURS   |  | HOURS   |  | HOURS   |  | HOURS    |  | COINCIDENT LOADS-- |  |
| COOLING   |  | HEATING |  | HEATING |  | COOLING |  | FLOATING |  | HEATING ELECTRIC   |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | AVAIL.  |  | WHEN     |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  | AVAIL.  |  | FANS ON |  | FANS ON  |  | LOAD AT            |  |
| LOAD  |  | LOAD    |  |         |  |         |  |          |  |                    |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 8:55:28 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SET BACK FOR BLDG #406 CID BLDG  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>33.267<br>112.998<br>28/ 9<br>29.960<br>112.998<br>3/ 8<br>35.440<br>112.657<br>31/13<br>32.884<br>112.657<br>18/ 8<br>37.763<br>168.347<br>31/16<br>44.751<br>168.613<br>27/15<br>41.782<br>172.247<br>1/16<br>47.524<br>173.290<br>22/13<br>40.783<br>170.361<br>7/15<br>32.171<br>112.657<br>31/10<br>31.342<br>112.657<br>30/14<br>33.058<br>112.998<br>13/ 8 | NATURAL-GAS<br>105.465<br>530.555<br>28/ 7<br>75.480<br>506.371<br>3/ 7<br>54.267<br>462.730<br>14/ 7<br>14.330<br>301.984<br>5/ 7<br>3.286<br>217.964<br>9/ 7<br>0.000<br>0.000<br>30/ 1<br>0.000<br>0.000<br>31/ 1<br>31/ 1<br>0.000<br>0.000<br>31/ 1<br>0.000<br>30/ 1<br>12.711<br>308.828<br>20/ 7<br>41.669<br>414.227<br>14/ 7<br>90.708<br>527.350<br>12/ 7 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.267<br>112.998<br>28/ 9   | 105.465<br>530.555<br>28/ 7  |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 29.960<br>112.998<br>3/ 8  | 75.480<br>506.371<br>3/ 7  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 35.440<br>112.657<br>31/13   | 54.267<br>462.730<br>14/ 7   |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 32.884<br>112.657<br>18/ 8   | 14.330<br>301.984<br>5/ 7  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.763<br>168.347<br>31/16   | 3.286<br>217.964<br>9/ 7   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 44.751<br>168.613<br>27/15   | 0.000<br>0.000<br>30/ 1  |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 41.782<br>172.247<br>1/16  | 0.000<br>0.000<br>31/ 1  |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 47.524<br>173.290<br>22/13   | 0.000<br>0.000<br>31/ 1  |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 40.783<br>170.361<br>7/15  | 0.000<br>0.000<br>30/ 1  |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 32.171<br>112.657<br>31/10   | 12.711<br>308.828<br>20/ 7   |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 31.342<br>112.657<br>30/14   | 41.669<br>414.227<br>14/ 7   |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.058<br>112.998<br>13/ 8   | 90.708<br>527.350<br>12/ 7   |
|     | ONE YEAR<br>USE/PEAK                             | 440.725<br>173.290   | 397.915<br>530.555   |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 8:55:28 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SET BACK FOR BLDG #406 CID BLDG TOPEKA, KS  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 15.42       | 397.91      |
| SPACE COOL      | 57.53       | 0.00        |
| HVAC AUX        | 101.61      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 140.66      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 125.49      | 0.00        |
| TOTAL           | 440.71      | 397.91      |

TOTAL SITE ENERGY 838.64 MBTU 82.1 KBTU/SQFT-YR GROSS-AREA 180.6 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1721.41 MBTU 168.5 KBTU/SQFT-YR GROSS-AREA 370.7 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 14.4  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



AZIMUTH = 315 TILT = 32 SKY-FORM-FACTOR = 0.75  
GND-FORM-FACTOR = 0.25 ..

ROOF HEIGHT = 30.0 WIDTH = 19.5 CONS = MAINROOF  
AZIMUTH = 45 TILT = 37 SKY-FORM-FACTOR = 0.75  
GND-FORM-FACTOR = 0.25 ..

ROOF HEIGHT = 30.0 WIDTH = 19.5 CONS = MAINROOF  
AZIMUTH = 315 TILT = 37 SKY-FORM-FACTOR = 0.75  
GND-FORM-FACTOR = 0.25 ..

U-W HEIGHT = 24.0 WIDTH = 88.0 CONS = FLOOR ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
\$ E Z - D O E S Y S T E M S I N P U T \$  
\$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*  
  
LINE-4 \*RUN #2 DDC CONTROL FOR BLDG #406 \*  
LINE-5 \*CID BLDG \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
SYSTEMS-REPORT VERIFICATION=(SV-A)  
SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
SD\_WT\_HT =DAY-SCHEDULE (1,24) (70.) ..  
SD\_SM\_CL =DAY-SCHEDULE (1,24) (76.) ..  
SD\_WT\_CL =DAY-SCHEDULE (1,24) (70.2) ..  
SD\_SM\_HT =DAY-SCHEDULE (1,24) (75.8) ..  
SD\_OA % =DAY-SCHEDULE (1,24) (0.25) ..  
SD\_FAN\_CYC =DAY-SCHEDULE (1,6) (0.)  
(7,17) (1.)  
(18,24) (0.) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

```

SW_SM_CL  =WEEK-SCHEDULE  (ALL) SD_SM_CL  ..
SW_WT_CL  =WEEK-SCHEDULE  (ALL) SD_WT_CL  ..
SW_SM_HT  =WEEK-SCHEDULE  (ALL) SD_SM_HT  ..
SW_OA_%   =WEEK-SCHEDULE  (ALL) SD_OA_%   ..
SW_FAN_CYC =WEEK-SCHEDULE  (ALL) SD_FAN_CYC ..

```

## \$ FULL ON SYSTEM

```

S_ON      =SCHEDULE THRU DEC 31 SW_ON  ..

```

## \$ FULL OFF SYSTEM

```

S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..

```

## \$ HEATING SEASON

```

S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON  ..

```

## \$ COOLING SEASON

```

S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF ..

```

## \$ HEATING SET TEMP

```

S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
              THRU OCT  1 SW_SM_HT
              THRU DEC 31 SW_WT_HT ..

```

## \$ COOLING SET TEMP

```

S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
              THRU OCT  1 SW_SM_CL
              THRU DEC 31 SW_WT_CL ..

```

## \$ OUTSIDE AIR FRACTION

```

S_OA_%     =SCHEDULE THRU DEC 31 SW_OA_% ..

```

```

S_HRLY     =SCHEDULE THRU JAN 14 SW_OFF
              THRU JAN 15 SW_ON
              THRU AUG 21 SW_OFF
              THRU AUG 22 SW_ON
              THRU DEC 31 SW_OFF  ..

```

```

S_FAN_CYCL =SCHEDULE THRU DEC 31 SW_FAN_CYC ..

```

## \$ ZONE DESCRIPTION

```

SPACE_1    =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
              HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
              ZONE-TYPE = CONDITIONED

```



THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

# \$ SYSTEM DESCRIPTION

MZ\_W/\_DX =SYSTEM SYSTEM-TYPE = PMZS  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE-SCHED  
COOLING-SCHEDULE = S\_CL-SCHED  
HEAT-CONTROL = COLDEST COOL-CONTROL = WARMEST  
OA-CONTROL = FIXED SUPPLY-CFM = 6130.  
RATED-CFM = 6130. MIN-OUTSIDE-AIR = 0.25  
MIN-AIR-SCH = S\_OA\_% MAX-OA-FRACTION = 0.25  
FAN-SCHEDULE = S\_ON SUPPLY-STATIC = 4.5  
SUPPLY-EFF = 0.78 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  
MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 217000.  
COOL-SH-CAP = 134000. COIL-BF = 0.07  
HEATING-CAPACITY = -520000. CRANKCASE-MAX-T = 0.  
OUTSIDE-FAN-T = 45. HEAT-SOURCE = HOT-WATER  
ZONE-NAMES = (SPACE\_1, SPACE\_2, SPACE\_3) ..

# \$ HOURLY REPORT DESCRIPTION

AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = MZ\_W/\_DX  
VARIABLE-LIST = (3,5,6,17,18,19) ..

ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = SPACE\_2  
VARIABLE-LIST = (17,18,7,6) ..

AHU-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY  
REPORT-BLOCK = (AHU-BLOCK)

..  
ZONE-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY  
REPORT-BLOCK = (ZONE-BLOCK)

END ..  
COMPUTE SYSTEMS ..

INPUT PLANT ..

\$-----\$  
\$ E Z - D O E P L A N T S I N P U T \$  
\$-----\$

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 8:59:59 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |
|---|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|
| DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG #406 CID BLDG TOPEKA, KS                         |                             |                         |                      |                      |                             |                         |                      |                      |   |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ_W/_DX  |                             |                         |                      |                      |                             |                         |                      |                      |   |
| ----- C O O L I N G -----   |                             |                         |                      |                      |                             |                         |                      |                      |   |
| MONTH   | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) |
| JAN   | 0.00000                     |                         |                      |                      | -111.220                    | 15                      | 8                    | -7. F                | -301.864                                |
| FEB   | 0.00000                     |                         |                      |                      | -80.400                     | 3                       | 6                    | -2. F                | -253.887                                |
| MAR   | 0.00000                     |                         |                      |                      | -56.335                     | 4                       | 6                    | 14. F                | -201.509                                |
| APR   | 0.00000                     |                         |                      |                      | -14.520                     | 1                       | 1                    | 32. F                | -126.430                                |
| MAY   | 16.94104                    | 31 16                   | 88. F                | 75. F                | -2.315                      | 1                       | 7                    | 38. F                | -65.235                                 |
| JUN   | 56.28429                    | 20 13                   | 86. F                | 76. F                | 0.000                       |                         |                      |                      | 0.000                                   |
| JUL   | 76.40015                    | 1 16                    | 86. F                | 80. F                | 0.000                       |                         |                      |                      | 0.000                                   |
| AUG   | 76.55418                    | 23 13                   | 93. F                | 77. F                | 0.000                       |                         |                      |                      | 0.000                                   |
| SEP   | 32.22479                    | 6 13                    | 88. F                | 75. F                | 0.000                       |                         |                      |                      | 0.000                                   |
| OCT   | 0.00000                     |                         |                      |                      | -12.013                     | 20                      | 6                    | 24. F                | -126.694                                |
| NOV   | 0.00000                     |                         |                      |                      | -48.053                     | 3                       | 6                    | 13. F                | -191.837                                |
| DEC   | 0.00000                     |                         |                      |                      | -97.448                     | 13                      | 6                    | 2. F                 | -258.871                                |
| TOTAL   | 258.405                     |                         |                      |                      | -422.306                    |                         |                      |                      | -301.864                                |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      | 50.494                                  |

H4-30

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 8:59:59 SDL RUN 1 |                          |                          |  |                   |                            |                            |                  |                           |                                      |
|---|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------|---------------------------|--------------------------------------|
| DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG #406 CID BLDG TOPEKA, KS                         |                          |                          |  |                   |                            |                            |                  |                           |                                      |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ_W/_DX   |                          |                          |  |                   |                            |                            |                  |                           |                                      |
| ----- N U M B E R O F H O U R S -----   |                          |                          |  |                   |                            |                            |                  |                           |                                      |
| MONTH   | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON |
| JAN   | 0                        | 743                      | 0  | 1                 | 744                        | 0                          | 744              | 0                         | 1                                    |
| FEB   | 0                        | 667                      | 0  | 5                 | 672                        | 0                          | 672              | 0                         | 5                                    |
| MAR   | 0                        | 676                      | 0  | 68                | 744                        | 0                          | 744              | 0                         | 68                                   |
| APR   | 0                        | 513                      | 0  | 207               | 720                        | 0                          | 720              | 0                         | 207                                  |
| MAY   | 278                      | 223                      | 0  | 243               | 360                        | 384                        | 744              | 0                         | 243                                  |
| JUN   | 641                      | 0                        | 0  | 79                | 0                          | 720                        | 720              | 0                         | 79                                   |
| JUL   | 742                      | 0                        | 0  | 2                 | 744                        | 744                        | 744              | 0                         | 2                                    |
| AUG   | 739                      | 0                        | 0  | 5                 | 0                          | 744                        | 744              | 0                         | 5                                    |
| SEP   | 431                      | 0                        | 0  | 289               | 0                          | 720                        | 720              | 0                         | 289                                  |
| OCT   | 0                        | 505                      | 0  | 239               | 720                        | 24                         | 744              | 0                         | 239                                  |
| NOV   | 0                        | 634                      | 0  | 86                | 720                        | 0                          | 720              | 0                         | 86                                   |
| DEC   | 0                        | 740                      | 0  | 4                 | 744                        | 0                          | 744              | 0                         | 4                                    |
| ANNUAL  | 2831                     | 4701                     | 0  | 1228              | 5424                       | 3336                       | 8760             | 0                         | 1228                                 |

----- COINCIDENT LOADS -----

HEATING LOAD AT COOLING PEAK (KBTU/HR)

ELECTRIC LOAD AT COOLING PEAK (KW)

JAN -136.743 6.772

FEB -129.556 6.772

MAR -124.822 6.772

APR -14.946 4.151

MAY 0.000 49.224

JUN 0.000 49.047

JUL 0.000 50.260

AUG 0.000 50.392

SEP 0.000 49.309

OCT -70.399 6.772

NOV -141.949 6.772

DEC -186.964 4.151

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 8:59:59 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG #406 CID BLDG  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>37.463<br>110.727<br>28/ 9 | NATURAL-GAS<br>163.133<br>396.347<br>15/ 8 |
|-----|--|---|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.463<br>110.727<br>28/ 9                | 163.133<br>396.347<br>15/ 8                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.758<br>110.727<br>3/ 6                 | 123.085<br>343.299<br>3/ 6                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 38.399<br>110.385<br>31/ 9                | 90.631<br>283.607<br>4/ 6                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.682<br>108.719<br>5/ 8                 | 26.696<br>194.805<br>1/ 1                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 38.545<br>168.071<br>31/16                | 5.078<br>115.998<br>1/ 7                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 51.863<br>167.897<br>27/15                | 0.000<br>0.000<br>30/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 56.740<br>171.608<br>1/16                 | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 60.848<br>172.406<br>22/13                | 0.000<br>0.000<br>31/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 43.025<br>169.733<br>7/15                 | 0.000<br>0.000<br>30/ 1                    |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 32.820<br>110.385<br>20/ 8                | 22.799<br>195.125<br>20/ 6                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 34.436<br>110.385<br>30/ 9                | 77.944<br>272.381<br>3/ 6                  |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.362<br>110.727<br>13/ 8                | 146.446<br>348.883<br>13/ 6                |
|     | ONE YEAR<br>USE/PEAK                             | 498.939<br>172.406                        | 655.813<br>396.347                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 8:59:59 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG #406 CID BLDG  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU - | ELECTRICITY | NATURAL-GAS |
|-------------------------------|-------------|-------------|
| CATEGORY OF USE               |             |             |
| SPACE HEAT                    | 22.91       | 655.81      |
| SPACE COOL                    | 85.72       | 0.00        |
| HVAC AUX                      | 124.15      | 0.00        |
| DOM HOT WTR                   | 0.00        | 0.00        |
| AUX SOLAR                     | 0.00        | 0.00        |
| LIGHTS                        | 140.66      | 0.00        |
| VERT TRANS                    | 0.00        | 0.00        |
| MISC EQUIP                    | 125.49      | 0.00        |
| TOTAL                         | 498.93      | 655.81      |

TOTAL SITE ENERGY 1154.75 MBTU 113.0 KBTU/SQFT-YR GROSS-AREA 248.7 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2154.13 MBTU 210.8 KBTU/SQFT-YR GROSS-AREA 463.9 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 6.5  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

AZIMUTH = 315 TILT = 32 SKY-FORM-FACTOR = 0.75  
GND-FORM-FACTOR = 0.25 ..

ROOF HEIGHT = 30.0 WIDTH = 19.5 CONS = MAINROOF  
AZIMUTH = 45 TILT = 37 SKY-FORM-FACTOR = 0.75  
GND-FORM-FACTOR = 0.25 ..

ROOF HEIGHT = 30.0 WIDTH = 19.5 CONS = MAINROOF  
AZIMUTH = 315 TILT = 37 SKY-FORM-FACTOR = 0.75  
GND-FORM-FACTOR = 0.25 ..

U-W HEIGHT = 24.0 WIDTH = 88.0 CONS = FLOOR ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

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\$ E Z - D O E S Y S T E M S I N P U T \$  
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#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*  
LINE-4 \*RUN #3 ECONOMIZER FOR BLDG #406 \*  
LINE-5 \*CID BLDG \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
SYSTEMS-REPORT VERIFICATION=(SV-A)  
SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
SD\_WT\_HT =DAY-SCHEDULE (1,6) (55.)  
(7,17) (74.)  
(18,24) (55.) ..  
SD\_SM\_CL =DAY-SCHEDULE (1,6) (85.)  
(7,17) (72.)  
(18,24) (85.) ..  
SD\_WT\_CL =DAY-SCHEDULE (1,6) (58.)  
(7,17) (76.)  
(18,24) (58.) ..  
SD\_SM\_HT =DAY-SCHEDULE (1,6) (83.)  
(7,17) (70.)  
(18,24) (83.) ..  
SD\_OA\_% =DAY-SCHEDULE (1,24) (0.25) ..  
SD\_FAN\_CYC =DAY-SCHEDULE (1,6) (0.)

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                (7,17) (1.)
                (18,24) (0.) ..
SD_WT_HT_D =DAY-SCHEDULE (1,24) (55.) ..
SD_SM_CL_D =DAY-SCHEDULE (1,24) (85.) ..
SD_WT_CL_D =DAY-SCHEDULE (1,24) (57.) ..
SD_SM_HT_D =DAY-SCHEDULE (1,24) (83.) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..

SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT   =WEEK-SCHEDULE (WD) SD_WT_HT
              (WEH) SD_WT_HT_D ..

SW_SM_CL   =WEEK-SCHEDULE (WD) SD_SM_CL
              (WEH) SD_SM_CL_D ..

SW_WT_CL   =WEEK-SCHEDULE (WD) SD_WT_CL
              (WEH) SD_WT_CL_D ..

SW_SM_HT   =WEEK-SCHEDULE (WD) SD_SM_HT
              (WEH) SD_SM_HT_D ..

SW_OA_%    =WEEK-SCHEDULE (ALL) SD_OA_% ..

SW_FAN_CYC =WEEK-SCHEDULE (WD) SD_FAN_CYC
              (WEH) SD_OFF ..

$ FULL ON SYSTEM
S_ON      =SCHEDULE THRU DEC 31 SW_ON ..

$ FULL OFF SYSTEM
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..

$ HEATING SEASON
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT 1 SW_OFF
              THRU DEC 31 SW_ON ..

$ COOLING SEASON
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT 1 SW_ON
              THRU DEC 31 SW_OFF ..

$ HEATING SET TEMP
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
              THRU OCT 1 SW_SM_HT
              THRU DEC 31 SW_WT_HT ..

$ COOLING SET TEMP
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
              THRU OCT 1 SW_SM_CL
              THRU DEC 31 SW_WT_CL ..

$ OUTSIDE AIR FRACTION

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S\_OA\_% =SCHEDULE THRU DEC 31 SW\_OA\_% ..

S\_HRLY =SCHEDULE THRU JAN 14 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU JAN 16 SW\_OFF  
 THRU JAN 17 SW\_ON  
 THRU AUG 20 SW\_OFF  
 THRU AUG 22 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

#### \$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

#### \$ SYSTEM DESCRIPTION

MZ\_W/\_DX =SYSTEM SYSTEM-TYPE = PMZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED ECONO-LIMIT-T = 70.0 ←  
 HEAT-CONTROL = COLDEST COOL-CONTROL = WARMEST  
 SUPPLY-CFM = 6130. RATED-CFM = 6130.  
 MIN-OUTSIDE-AIR = 0.25 FAN-SCHEDULE = S\_FAN\_CYC  
 SUPPLY-STATIC = 4.5 SUPPLY-EFF = 0.78  
 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY MIN-CFM-RATIO = 1.0  
 COOLING-CAPACITY = 217000. COOL-SH-CAP = 134000.  
 COIL-BF = 0.07 HEATING-CAPACITY = -520000.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER  
 ZONE-NAMES = (SPACE\_1, SPACE\_2, SPACE\_3) ..

#### \$ HOURLY REPORT DESCRIPTION

AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = MZ\_W/\_DX

```

VARIABLE-LIST = (3,5,6,17,18,19) ..
ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = SPACE_2
VARIABLE-LIST = (17,18,7,31) ..
AHU-HRLY   = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY
REPORT-BLOCK = (AHU-BLOCK)

..
ZONE-HRLY   = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY
REPORT-BLOCK = (ZONE-BLOCK)

..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

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$-----$
$ E Z - D O E   P L A N T S   I N P U T $
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## \$ GENERAL PROJECT DATA

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TITLE LINE-1 *   EMC       ENGINEERS       INC.       *
LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
LINE-3 *   DENVER,      CO       80227       *

LINE-4 *RUN #3 ECONOMIZER FOR BLDG #406       *
LINE-5 *CID BLDG              * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC WARNINGS ..
PLANT-REPORT VERIFICATION=(PV-A)
SUMMARY=(PS-B,BEPS)
HOURLY-DATA-SAVE = YES ..

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## \$ SCHEDULES

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PD_ON      =DAY-SCHEDULE (1,24) (1.) ..
PD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

PW_OFF     =WEEK-SCHEDULE (ALL) PD_OFF ..
PW_ON      =WEEK-SCHEDULE (ALL) PD_ON  ..

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## \$ HEATING SEASON

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P_HEAT     =SCHEDULE THRU MAY 15 PW_ON
            THRU OCT  1 PW_OFF
            THRU DEC 31 PW_ON  ..

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## \$ COOLING SEASON

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P_COOL     =SCHEDULE THRU MAY 15 PW_OFF
            THRU OCT  1 PW_ON
            THRU DEC 31 PW_OFF ..

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| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 9: 5:17 SDL RUN 1 |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
|---|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
| DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG #406 CID BLDG TOPEKA, KS                          |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ_W/_DX  |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----                                   |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
| MONTH   | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -85.770                     | 14                      | -1.1.F               | -2.1.F               | -457.677                                | 8605.                     | 30.465                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -59.386                     | 3                       | -5.1.F               | -6.1.F               | -463.837                                | 7816.                     | 30.465                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -42.445                     | 4                       | 14.1.F               | 12.1.F               | -415.615                                | 9464.                     | 30.365                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -10.741                     | 5                       | 30.1.F               | 27.1.F               | -281.737                                | 9248.                     | 30.365                          |
| MAY   | 13.00987                    | 31 16                   | 88.F                 | 75.F                 | 195.731                                 | -2.444                      | 9                       | 43.1.F               | 43.1.F               | -205.555                                | 10760.                    | 50.089                          |
| JUN   | 38.45084                    | 30 10                   | 82.F                 | 75.F                 | 202.977                                 | 0.000                       |                         |                      |                      | 0.000                                   | 12983.                    | 49.905                          |
| JUL   | 44.77910                    | 1 16                    | 86.F                 | 80.F                 | 218.906                                 | 0.000                       |                         |                      |                      | 0.000                                   | 12362.                    | 51.278                          |
| AUG   | 49.48270                    | 16 8                    | 69.F                 | 66.F                 | 210.160                                 | 0.000                       |                         |                      |                      | 0.000                                   | 14077.                    | 51.290                          |
| SEP   | 25.91281                    | 23 16                   | 69.F                 | 67.F                 | 210.841                                 | 0.000                       |                         |                      |                      | 0.000                                   | 11786.                    | 50.416                          |
| OCT   | 0.00000                     |                         |                      |                      | 0.000                                   | -9.914                      | 20                      | 23.1.F               | 23.1.F               | -297.108                                | 9067.                     | 30.365                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -32.096                     | 3                       | 19.1.F               | 17.1.F               | -373.890                                | 8453.                     | 30.365                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -72.542                     | 13                      | 2.1.F                | 1.1.F                | -452.998                                | 8600.                     | 30.465                          |
| TOTAL   | 171.635                     |                         |                      |                      | 218.906                                 | -315.337                    |                         |                      |                      | -463.837                                | 123223.                   | 51.290                          |
| MAX   |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |

H4-37

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 9: 5:17 SDL RUN 1 |  |  |  |  |  |  |  |  |  |  |  |
|---|--|--|--|--|--|--|--|--|--|--|--|
| DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG #406 CID BLDG TOPEKA, KS                          |  |  |  |  |  |  |  |  |  |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ_W/_DX   |  |  |  |  |  |  |  |  |  |  |  |
| ----- N U M B E R O F H O U R S -----   |  |  |  |  |  |  |  |  |  |  |  |
| HOURS COINCIDENT COOL-HEAT LOAD   |  |  |  |  |  |  |  |  |  |  |  |
| HOURS HEATING LOAD  |  |  |  |  |  |  |  |  |  |  |  |
| HOURS COOLING LOAD  |  |  |  |  |  |  |  |  |  |  |  |
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EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 9: 5:17 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG #406 CID BLDG  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR                  | ELECTRICITY<br>33.640<br>114.326<br>28/ 9                | NATURAL-GAS<br>130.107<br>602.298<br>14/ 7             |
|-----|---|--|--|
| JAN | TOTAL (MBTU)<br>30.173<br>PEAK (KBTU)<br>114.326<br>DY/HR<br>3/ 7 | 35.089<br>113.984<br>31/13<br>32.447<br>113.984<br>18/ 8 | 69.217<br>555.970<br>4/ 7<br>19.227<br>403.326<br>5/ 7 |
| FEB | TOTAL (MBTU)<br>30.173<br>PEAK (KBTU)<br>114.326<br>DY/HR<br>3/ 7 | 35.089<br>113.984<br>31/13<br>32.447<br>113.984<br>18/ 8 | 69.217<br>555.970<br>4/ 7<br>19.227<br>403.326<br>5/ 7 |
| MAR | TOTAL (MBTU)<br>30.173<br>PEAK (KBTU)<br>114.326<br>DY/HR<br>3/ 7 | 35.089<br>113.984<br>31/13<br>32.447<br>113.984<br>18/ 8 | 69.217<br>555.970<br>4/ 7<br>19.227<br>403.326<br>5/ 7 |
| APR | TOTAL (MBTU)<br>30.173<br>PEAK (KBTU)<br>114.326<br>DY/HR<br>3/ 7 | 35.089<br>113.984<br>31/13<br>32.447<br>113.984<br>18/ 8 | 69.217<br>555.970<br>4/ 7<br>19.227<br>403.326<br>5/ 7 |
| MAY | TOTAL (MBTU)<br>30.173<br>PEAK (KBTU)<br>114.326<br>DY/HR<br>3/ 7 | 35.089<br>113.984<br>31/13<br>32.447<br>113.984<br>18/ 8 | 69.217<br>555.970<br>4/ 7<br>19.227<br>403.326<br>5/ 7 |
| JUN | TOTAL (MBTU)<br>30.173<br>PEAK (KBTU)<br>114.326<br>DY/HR<br>3/ 7 | 35.089<br>113.984<br>31/13<br>32.447<br>113.984<br>18/ 8 | 69.217<br>555.970<br>4/ 7<br>19.227<br>403.326<br>5/ 7 |
| JUL | TOTAL (MBTU)<br>30.173<br>PEAK (KBTU)<br>114.326<br>DY/HR<br>3/ 7 | 35.089<br>113.984<br>31/13<br>32.447<br>113.984<br>18/ 8 | 69.217<br>555.970<br>4/ 7<br>19.227<br>403.326<br>5/ 7 |
| AUG | TOTAL (MBTU)<br>30.173<br>PEAK (KBTU)<br>114.326<br>DY/HR<br>3/ 7 | 35.089<br>113.984<br>31/13<br>32.447<br>113.984<br>18/ 8 | 69.217<br>555.970<br>4/ 7<br>19.227<br>403.326<br>5/ 7 |
| SEP | TOTAL (MBTU)<br>30.173<br>PEAK (KBTU)<br>114.326<br>DY/HR<br>3/ 7 | 35.089<br>113.984<br>31/13<br>32.447<br>113.984<br>18/ 8 | 69.217<br>555.970<br>4/ 7<br>19.227<br>403.326<br>5/ 7 |
| OCT | TOTAL (MBTU)<br>30.173<br>PEAK (KBTU)<br>114.326<br>DY/HR<br>3/ 7 | 35.089<br>113.984<br>31/13<br>32.447<br>113.984<br>18/ 8 | 69.217<br>555.970<br>4/ 7<br>19.227<br>403.326<br>5/ 7 |
| NOV | TOTAL (MBTU)<br>30.173<br>PEAK (KBTU)<br>114.326<br>DY/HR<br>3/ 7 | 35.089<br>113.984<br>31/13<br>32.447<br>113.984<br>18/ 8 | 69.217<br>555.970<br>4/ 7<br>19.227<br>403.326<br>5/ 7 |
| DEC | TOTAL (MBTU)<br>30.173<br>PEAK (KBTU)<br>114.326<br>DY/HR<br>3/ 7 | 35.089<br>113.984<br>31/13<br>32.447<br>113.984<br>18/ 8 | 69.217<br>555.970<br>4/ 7<br>19.227<br>403.326<br>5/ 7 |
|     | ONE YEAR<br>USE/PEAK  | 439.378<br>175.127                                       | 500.930<br>609.018                                     |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 9: 5:17 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG #406 CID BLDG TOPEKA, KS  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 18.65       | 500.93      |
| SPACE COOL      | 56.01       | 0.00        |
| HVAC AUX        | 98.55       | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 140.66      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 125.49      | 0.00        |
| TOTAL           | 439.36      | 500.93      |

TOTAL SITE ENERGY 940.31 MBTU 92.0 KBTU/SQFT-YR GROSS-AREA 202.5 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1820.38 MBTU 178.1 KBTU/SQFT-YR GROSS-AREA 392.0 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 16.9  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



AZIMUTH = 315 TILT = 32 SKY-FORM-FACTOR = 0.75  
GND-FORM-FACTOR = 0.25 ..

```

ROOF      HEIGHT = 30.0  WIDTH = 19.5  CONS = MAINROOF
          AZIMUTH = 45   TILT = 37   SKY-FORM-FACTOR = 0.75
          GND-FORM-FACTOR = 0.25    ..

```

```

ROOF      HEIGHT = 30.0  WIDTH = 19.5  CONS = MAINROOF
          AZIMUTH = 315  TILT = 37    SKY-FORM-FACTOR = 0.75
          GND-FORM-FACTOR = 0.25    ..

```

U-W      HEIGHT = 24.0    WIDTH = 88.0    CONS = FLOOR ..

END . .

COMPUTE LOADS . .

## INPUT SYSTEMS . .

```

$-----$
$EZ - DOE  SYSTEMS  INPUT$
$-----$

```

## \$ GENERAL PROJECT DATA

|       |        |   |               |                      |       |   |
|-------|--------|---|---------------|----------------------|-------|---|
| TITLE | LINE-1 | * | EMC           | ENGINEERS            | INC.  | * |
|       | LINE-2 | * | EZDOE - ELITE | SOFTWARE DEVELOPMENT | INC*  |   |
|       | LINE-3 | * | DENVER,       | CO                   | 80227 | * |

LINE-4 \*RUN #4 NIGHT INFILTRATION FOR BLDG #406 \*  
LINE-5 \*CID BLDG \*

```

ABORT                ERRORS  ..
DIAGNOSTIC           WARNINGS ..
SYSTEMS-REPORT       VERIFICATION=(SV-A)
                     SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                     HOURLY-DATA-SAVE = YES  ..

```

## § SCHEDULES

```
SD_ON      =DAY-SCHEDULE (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
SD_WT_HT   =DAY-SCHEDULE (1,24) (74.) ..
SD_SM_CL   =DAY-SCHEDULE (1,24) (72.) ..
SD_WT_CL   =DAY-SCHEDULE (1,24) (74.2) ..
SD_SM_HT   =DAY-SCHEDULE (1,24) (71.8) ..
SD_OA_t    =DAY-SCHEDULE (1,6) (0.)
           (7,17) (0.25)
           (18,24) (0.) ..
```

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..

SW OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW WT HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

```

SW_SM_CL  =WEEK-SCHEDULE  (ALL) SD_SM_CL  ..
SW_WT_CL  =WEEK-SCHEDULE  (ALL) SD_WT_CL  ..
SW_SM_HT  =WEEK-SCHEDULE  (ALL) SD_SM_HT  ..
SW_OA_%   =WEEK-SCHEDULE  (ALL) SD_OA_%   ..

```

## \$ FULL ON SYSTEM

```

S_ON      =SCHEDULE THRU DEC 31 SW_ON  ..

```

## \$ FULL OFF SYSTEM

```

S_OFF     =SCHEDULE THRU DEC 31 SW_OFF  ..

```

## \$ HEATING SEASON

```

S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON  ..

```

## \$ COOLING SEASON

```

S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF  ..

```

## \$ HEATING SET TEMP

```

S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
              THRU OCT  1 SW_SM_HT
              THRU DEC 31 SW_WT_HT  ...

```

## \$ COOLING SET TEMP

```

S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
              THRU OCT  1 SW_SM_CL
              THRU DEC 31 SW_WT_CL  ..

```

## \$ OUTSIDE AIR FRACTION

```

S_OA_%     =SCHEDULE THRU DEC 31 SW_OA_%  ..

```

```

S_HRLY     =SCHEDULE THRU JAN 14 SW_OFF
              THRU JAN 15 SW_ON
              THRU AUG 21 SW_OFF
              THRU AUG 22 SW_ON
              THRU DEC 31 SW_OFF  ..

```

## \$ ZONE DESCRIPTION

```

SPACE_1    =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
              HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
              ZONE-TYPE = CONDITIONED
              THERMOSTAT-TYPE = PROPORTIONAL  THROTTLING-RANGE = 0.2
              SIZING-OPTION = FROM-LOADS  ..

```

```


SPACE_2    =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
              HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F

```

ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ\_W/\_DX =SYSTEM SYSTEM-TYPE = PMZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED OA-CONTROL = FIXED  
 SUPPLY-CFM = 6130. RATED-CFM = 6130.  
 MIN-OUTSIDE-AIR = 0.25 MIN-AIR-SCH = S\_OA %   
 MAX-OA-FRACTION = 0.25 FAN-SCHEDULE = S\_ON  
 SUPPLY-STATIC = 4.5 SUPPLY-EFF = 0.78  
 NIGHT-CYCLE-CTRL = STAY-OFF MIN-CFM-RATIO = 1.0  
 COOLING-CAPACITY = 217000. COOL-SH-CAP = 134000.  
 COIL-BF = 0.07 HEATING-CAPACITY = -520000.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER  
 ZONE-NAMES = (SPACE\_1, SPACE\_2, SPACE\_3) ..

## \$ HOURLY REPORT DESCRIPTION

AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = MZ\_W/\_DX  
 VARIABLE-LIST = (3,5,6,17,18,19) ..  
 ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = SPACE\_2  
 VARIABLE-LIST = (17,18,7,6) ..  
 AHU-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY  
 REPORT-BLOCK = (AHU-BLOCK)  
 ..  
 ZONE-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY  
 REPORT-BLOCK = (ZONE-BLOCK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$EZ - DOE PLANTS INPUT \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 9:12:40 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG #406 CID BLDG  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ\_W/DX TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                           |                                 |  |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|--|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |  |
| JAN   | 0.00000                     |                         |                      |                      | -90.732                     | 15                      | -7.F                 | -8.F                 | -325.757                                | 9589.                     | 30.465                          |  |
| FEB   | 0.00000                     |                         |                      |                      | -65.501                     | 3                       | -5.F                 | -6.F                 | -259.752                                | 8667.                     | 30.465                          |  |
| MAR   | 0.00000                     |                         |                      |                      | -44.605                     | 6                       | 19.F                 | 18.F                 | -218.430                                | 10203.                    | 30.365                          |  |
| APR   | 0.00000                     |                         |                      |                      | -11.860                     | 17                      | 35.F                 | 31.F                 | -127.868                                | 9484.                     | 30.365                          |  |
| MAY   | 24.35596                    | 31                      | 88.F                 | 75.F                 | -1.768                      | 1                       | 38.F                 | 36.F                 | -81.905                                 | 11896.                    | 49.139                          |  |
| JUN   | 65.14420                    | 30                      | 82.F                 | 75.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 16008.                    | 49.063                          |  |
| JUL   | 79.40778                    | 1                       | 86.F                 | 80.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 16921.                    | 50.176                          |  |
| AUG   | 81.15347                    | 23                      | 93.F                 | 77.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 18253.                    | 50.405                          |  |
| SEP   | 42.64534                    | 1                       | 78.F                 | 73.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 13568.                    | 49.615                          |  |
| OCT   | 0.00717                     | 1                       | 85.F                 | 68.F                 | -10.084                     | 20                      | 23.F                 | 23.F                 | -125.685                                | 9276.                     | 30.365                          |  |
| NOV   | 0.00000                     |                         |                      |                      | -38.403                     | 12                      | 21.F                 | 20.F                 | -193.500                                | 9175.                     | 30.365                          |  |
| DEC   | 0.00000                     |                         |                      |                      | -79.959                     | 13                      | 2.F                  | 1.F                  | -257.308                                | 9584.                     | 30.465                          |  |
| TOTAL | 292.714                     |                         |                      |                      | -342.913                    |                         |                      |                      | -325.757                                | 142623.                   | 50.405                          |  |
| TAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 9:12:40 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG #406 CID BLDG  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ\_W/DX TOPEKA, KS

| MONTH  | HOURS           |                          |                            |                   | NUMBER OF                  |                            |                           |                           | HOURS                                |  |  |  | --COINCIDENT LOADS-- |  |  |  |
|--------|-----------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|---------------------------|---------------------------|--------------------------------------|--|--|--|----------------------|--|--|--|
|        | COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |                      |  |  |  |
| JAN    | 0               | 744                      | 0                          | 0                 | 744                        | 0                          | 0                         | 0                         | 0                                    | -84.557  | 6.772  |  |                      |  |  |  |
| FEB    | 0               | 672                      | 0                          | 0                 | 672                        | 0                          | 0                         | 0                         | 0                                    | -76.574  | 6.772  |  |                      |  |  |  |
| MAR    | 0               | 744                      | 0                          | 0                 | 744                        | 0                          | 0                         | 0                         | 0                                    | -73.037  | 6.772  |  |                      |  |  |  |
| APR    | 0               | 720                      | 0                          | 0                 | 720                        | 0                          | 0                         | 0                         | 0                                    | -1.563   | 4.151  |  |                      |  |  |  |
| MAY    | 351             | 360                      | 0                          | 33                | 360                        | 384                        | 0                         | 0                         | 33                                   | 0.000  | 49.139   |  |                      |  |  |  |
| JUN    | 699             | 0                        | 0                          | 21                | 0                          | 720                        | 0                         | 0                         | 21                                   | 0.000  | 48.627   |  |                      |  |  |  |
| JUL    | 741             | 0                        | 0                          | 3                 | 744                        | 744                        | 0                         | 0                         | 3                                    | 0.000  | 50.176   |  |                      |  |  |  |
| AUG    | 739             | 0                        | 0                          | 5                 | 744                        | 744                        | 0                         | 0                         | 5                                    | 0.000  | 50.312   |  |                      |  |  |  |
| SEP    | 592             | 0                        | 0                          | 128               | 720                        | 720                        | 0                         | 0                         | 128                                  | 0.000  | 47.913   |  |                      |  |  |  |
| OCT    | 2               | 720                      | 0                          | 22                | 720                        | 24                         | 0                         | 0                         | 22                                   | 0.000  | 4.784  |  |                      |  |  |  |
| NOV    | 0               | 720                      | 0                          | 0                 | 720                        | 0                          | 0                         | 0                         | 0                                    | -78.823  | 6.772  |  |                      |  |  |  |
| DEC    | 0               | 744                      | 0                          | 0                 | 744                        | 0                          | 0                         | 0                         | 0                                    | -128.062   | 4.151  |  |                      |  |  |  |
| ANNUAL | 3124            | 5424                     | 0                          | 212               | 5424                       | 3336                       | 0                         | 0                         | 212                                  |  |  |  |                      |  |  |  |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 9:12:40 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG #406 CID BLDG  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|-----|--|---|---|
| JAN | 37.837<br>141.184<br>28/ 9                       | 111.258<br>34.065<br>15/ 7                          | 427.719<br>107.004<br>6/ 7                          |
| FEB | 34.065<br>111.258<br>3/ 8                        | 38.354<br>110.916<br>31/10                          | 76.584<br>307.179<br>6/ 7                           |
| MAR | 38.354<br>110.916<br>31/10                       | 33.597<br>110.452<br>5/ 8                           | 23.949<br>199.849<br>17/ 7                          |
| APR | 33.597<br>110.452<br>5/ 8                        | 40.876<br>167.782<br>31/16                          | 4.996<br>143.407<br>1/ 7                            |
| MAY | 40.876<br>167.782<br>31/16                       | 54.658<br>167.523<br>27/15                          | 0.000<br>0.000<br>30/ 1                             |
| JUN | 54.658<br>167.523<br>27/15                       | 57.777<br>171.324<br>1/16                           | 0.000<br>0.000<br>31/ 1                             |
| JUL | 57.777<br>171.324<br>1/16                        | 62.324<br>172.103<br>22/13                          | 0.000<br>0.000<br>31/ 1                             |
| AUG | 62.324<br>172.103<br>22/13                       | 46.328<br>169.407<br>7/15                           | 0.000<br>0.000<br>30/ 1                             |
| SEP | 46.328<br>169.407<br>7/15                        | 32.747<br>110.916<br>20/ 8                          | 21.036<br>197.197<br>20/ 7                          |
| OCT | 32.747<br>110.916<br>20/ 8                       | 34.437<br>110.916<br>30/12                          | 66.697<br>278.146<br>12/ 7                          |
| NOV | 34.437<br>110.916<br>30/12                       | 37.707<br>111.258<br>13/ 8                          | 127.642<br>351.677<br>13/ 7                         |
| DEC | 37.707<br>111.258<br>13/ 8                       |   |   |
|     | ONE YEAR<br>USE/PEAK                             | 510.709<br>172.103                                  | 569.091<br>427.719                                  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 9:12:40 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG #406 CID BLDG  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 23.73       | 569.09      |
| SPACE COOL      | 96.67       | 0.00        |
| HVAC AUX        | 124.15      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 140.66      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 125.49      | 0.00        |
| TOTAL           | 510.71      | 569.09      |

TOTAL SITE ENERGY 1079.80 MBTU 105.7 KBTU/SQFT-YR GROSS-AREA 232.5 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2102.75 MBTU 205.8 KBTU/SQFT-YR GROSS-AREA 452.8 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 1.9  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

AZIMUTH = 315 TILT = 32 SKY-FORM-FACTOR = 0.75  
GND-FORM-FACTOR = 0.25 ..

ROOF HEIGHT = 30.0 WIDTH = 19.5 CONS = MAINROOF  
AZIMUTH = 45 TILT = 37 SKY-FORM-FACTOR = 0.75  
GND-FORM-FACTOR = 0.25 ..

ROOF HEIGHT = 30.0 WIDTH = 19.5 CONS = MAINROOF  
AZIMUTH = 315 TILT = 37 SKY-FORM-FACTOR = 0.75  
GND-FORM-FACTOR = 0.25 ..

U-W HEIGHT = 24.0 WIDTH = 88.0 CONS = FLOOR ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
\$ E Z - D O E S Y S T E M S I N P U T \$  
\$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #5 DAY INFILTRATION FOR BLDG #406 \*  
LINE-5 \*CID BLDG \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
SYSTEMS-REPORT VERIFICATION=(SV-A)  
SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
HOURLY-DATA-SAVE = YES ...

# \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
SD\_WT\_HT =DAY-SCHEDULE (1,24) (74.) ..  
SD\_SM\_CL =DAY-SCHEDULE (1,24) (72.) ..  
SD\_WT\_CL =DAY-SCHEDULE (1,24) (74.2) ..  
SD\_SM\_HT =DAY-SCHEDULE (1,24) (71.8) ..  
SD\_OA\_\* =DAY-SCHEDULE (1,6) (0.25)  
(7,17) (0.)  
(18,24) (0.25) ..



SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..

SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..

SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..

SW\_OA\_% =WEEK-SCHEDULE (ALL) SD\_OA\_% ..

#### \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

#### \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

#### \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
THRU OCT 1 SW\_OFF  
THRU DEC 31 SW\_ON ..

#### \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

#### \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

#### \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

#### \$ OUTSIDE AIR FRACTION

S\_OA\_% =SCHEDULE THRU DEC 31 SW\_OA\_% ..

S\_HRLY =SCHEDULE THRU JAN 14 SW\_OFF  
THRU JAN 15 SW\_ON  
THRU AUG 21 SW\_OFF  
THRU AUG 22 SW\_ON  
THRU DEC 31 SW\_OFF ..

#### \$ ZONE DESCRIPTION


SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F

ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ\_W/\_DX =SYSTEM SYSTEM-TYPE = PMZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED OA-CONTROL = FIXED  
 SUPPLY-CFM = 6130. RATED-CFM = 6130.  
 MIN-OUTSIDE-AIR = 0.25 MIN-AIR-SCH = S\_OA %   
 MAX-OA-FRACTION = 0.25 FAN-SCHEDULE = S\_ON  
 SUPPLY-STATIC = 4.5 SUPPLY-EFF = 0.78  
 NIGHT-CYCLE-CTRL = STAY-OFF MIN-CFM-RATIO = 1.0  
 COOLING-CAPACITY = 217000. COOL-SH-CAP = 134000.  
 COIL-BF = 0.07 HEATING-CAPACITY = -520000.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER  
 ZONE-NAMES = (SPACE\_1, SPACE\_2, SPACE\_3) ..

## \$ HOURLY REPORT DESCRIPTION

AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = MZ\_W/\_DX  
 VARIABLE-LIST = (3,5,6,17,18,19) ..  
 ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = SPACE\_2  
 VARIABLE-LIST = (17,18,7,6) ..  
 AHU-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY  
 REPORT-BLOCK = (AHU-BLOCK)

..  
 ZONE-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY  
 REPORT-BLOCK = (ZONE-BLOCK)

END ..

COMPUTE SYSTEMS ..

INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 9:22:49 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG #406 CID BLDG  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ\_W\_DX TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -97.958                     | 15                      | -8.F                 | -9.F                 | -318.149                                | 9589.                              | 30.465                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -71.810                     | 3                       | -1.F                 | -2.F                 | -272.115                                | 8667.                              | 30.465                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -52.842                     | 4                       | 14.F                 | 12.F                 | -219.661                                | 10203.                             | 30.365                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -16.847                     | 1                       | 32.F                 | 29.F                 | -143.026                                | 9484.                              | 30.365                          |
| MAY   | 24.18091                    | 31                      | 18                   | 90.F                 | 192.347                                 | -3.292                      | 1                       | 37.F                 | 37.F                 | -84.753                                 | 11858.                             | 46.592                          |
| JUN   | 65.55560                    | 27                      | 18                   | 88.F                 | 192.395                                 | 0.000                       |                         |                      |                      | 0.000                                   | 16037.                             | 47.111                          |
| JUL   | 81.51467                    | 1                       | 18                   | 87.F                 | 214.158                                 | 0.000                       |                         |                      |                      | 0.000                                   | 17113.                             | 47.585                          |
| AUG   | 81.84739                    | 22                      | 18                   | 93.F                 | 185.717                                 | 0.000                       |                         |                      |                      | 0.000                                   | 18350.                             | 48.754                          |
| SEP   | 42.60931                    | 22                      | 18                   | 85.F                 | 190.580                                 | 0.000                       |                         |                      |                      | 0.000                                   | 13548.                             | 47.425                          |
| OCT   | 0.00000                     |                         |                      |                      | 0.000                                   | -14.769                     | 20                      | 24.F                 | 23.F                 | -139.971                                | 9275.                              | 30.365                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -45.894                     | 3                       | 13.F                 | 12.F                 | -208.658                                | 9175.                              | 30.365                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -86.720                     | 13                      | 2.F                  | 1.F                  | -277.031                                | 9584.                              | 30.465                          |
| TOTAL | 295.708                     |                         |                      |                      |   | -390.130                    |                         |                      |                      |   | 142881.                            |                                 |
| MAX   |                             |                         |                      |                      | 214.158                                 |                             |                         |                      |                      | -318.149                                |                                    | 48.754                          |

EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 9:22:49 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG #406 CID BLDG  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ\_W\_DX TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |                            |                   |                            |                            |                              |                           |                                      |  |  |  |  | --COINCIDENT LOADS-- |  |
|--------|---------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|--|--|----------------------|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |                      |  |
| JAN    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -154.527   | 6.772  | -154.527   | 6.772  |                      |  |
| FEB    | 0                         | 672                      | 0                          | 0                 | 672                        | 0                          | 672                          | 0                         | 0                                    | -146.773   | 6.772  | -146.773   | 6.772  |                      |  |
| MAR    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -141.194   | 6.772  | -141.194   | 6.772  |                      |  |
| APR    | 0                         | 720                      | 0                          | 0                 | 720                        | 0                          | 720                          | 0                         | 0                                    | -41.135  | 4.151  | -41.135  | 4.151  |                      |  |
| MAY    | 308                       | 360                      | 0                          | 76                | 360                        | 384                        | 744                          | 0                         | 76                                   | 0.000  | 26.916   | 0.000  | 26.916   |                      |  |
| JUN    | 667                       | 0                        | 0                          | 53                | 0                          | 720                        | 720                          | 0                         | 53                                   | 0.000  | 26.514   | 0.000  | 26.514   |                      |  |
| JUL    | 737                       | 0                        | 0                          | 7                 | 0                          | 744                        | 744                          | 0                         | 7                                    | 0.000  | 27.954   | 0.000  | 27.954   |                      |  |
| AUG    | 729                       | 0                        | 0                          | 15                | 0                          | 744                        | 744                          | 0                         | 15                                   | 0.000  | 26.841   | 0.000  | 26.841   |                      |  |
| SEP    | 514                       | 0                        | 0                          | 206               | 0                          | 720                        | 720                          | 0                         | 206                                  | 0.000  | 25.825   | 0.000  | 25.825   |                      |  |
| OCT    | 0                         | 720                      | 0                          | 24                | 720                        | 24                         | 744                          | 0                         | 24                                   | -83.578  | 6.772  | -83.578  | 6.772  |                      |  |
| NOV    | 0                         | 720                      | 0                          | 0                 | 720                        | 0                          | 720                          | 0                         | 0                                    | -158.688   | 6.772  | -158.688   | 6.772  |                      |  |
| DEC    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -205.313   | 4.151  | -205.313   | 4.151  |                      |  |
| ANNUAL | 2955                      | 5424                     | 0                          | 381               | 5424                       | 3336                       | 8760                         | 0                         | 381                                  |  |  |  |  |                      |  |

EMC ENGINEERS INC. 80227 E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 9:22:49 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #5 DAY INFILTRATION FOR BLDG #406 CID BLDG  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>37.131<br>111.089<br>28/ 9<br>33.302<br>111.089<br>3/ 8<br>38.116<br>109.125<br>4/ 8<br>33.902<br>105.435<br>1/ 8<br>40.878<br>159.085<br>31/17<br>54.758<br>160.856<br>28/17<br>58.430<br>162.474<br>22/16<br>62.655<br>166.467<br>11/16<br>46.259<br>161.930<br>7/16<br>33.088<br>104.580<br>20/ 8<br>34.286<br>108.061<br>3/ 8<br>36.999<br>111.089<br>13/ 8 | NATURAL-GAS<br>145.418<br>417.730<br>15/ 6<br>110.201<br>366.897<br>3/ 6<br>85.188<br>307.317<br>4/ 6<br>31.643<br>217.094<br>1/ 1<br>7.535<br>145.965<br>1/ 6<br>0.000<br>0.000<br>30/ 1<br>0.000<br>0.000<br>31/ 1<br>0.000<br>0.000<br>30/ 1<br>28.566<br>213.420<br>20/ 6<br>74.918<br>294.595<br>3/ 6<br>131.501<br>372.391<br>13/ 6 |
|-----|--|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.131<br>111.089<br>28/ 9   | 145.418<br>417.730<br>15/ 6   |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.302<br>111.089<br>3/ 8  | 110.201<br>366.897<br>3/ 6  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 38.116<br>109.125<br>4/ 8  | 85.188<br>307.317<br>4/ 6   |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.902<br>105.435<br>1/ 8  | 31.643<br>217.094<br>1/ 1   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 40.878<br>159.085<br>31/17   | 7.535<br>145.965<br>1/ 6  |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 54.758<br>160.856<br>28/17   | 0.000<br>0.000<br>30/ 1   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 58.430<br>162.474<br>22/16   | 0.000<br>0.000<br>31/ 1   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 62.655<br>166.467<br>11/16   | 0.000<br>0.000<br>31/ 1   |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 46.259<br>161.930<br>7/16  | 0.000<br>0.000<br>30/ 1   |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.088<br>104.580<br>20/ 8   | 28.566<br>213.420<br>20/ 6  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 34.286<br>108.061<br>3/ 8  | 74.918<br>294.595<br>3/ 6   |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 36.999<br>111.089<br>13/ 8   | 131.501<br>372.391<br>13/ 6   |
|     | ONE YEAR<br>USE/PEAK                             | 509.802<br>166.467   | 614.970<br>417.730  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 9:22:49 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG #406 CID BLDG TOPEKA, KS  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 21.94       | 614.97      |
| SPACE COOL                                       | 97.55       | 0.00        |
| HVAC AUX   | 124.15      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 140.66      | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 125.49      | 0.00        |
| TOTAL  | 509.79      | 614.97      |

TOTAL SITE ENERGY 1124.77 MBTU 110.1 KBTU/SQFT-YR GROSS-AREA 242.2 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2145.91 MBTU 210.0 KBTU/SQFT-YR GROSS-AREA 462.1 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 3.1  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



**COMPUTER ENERGY SIMULATIONS**

**BLDG. 7618  
BARRACKS BUILDINGS**



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

BUILDING NO.:  
BLDG. TYPE:

7618  
ENL BARRACKS W/O DINING

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

## ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3 | RUN4 | RUN5 |
|----------------|---------|---------|---------|------|------|------|
| HEATING (MBtu) | 995.9   | 846.7   | 743.5   | 0.0  | 0.0  | 0.0  |
| COOLING (kWH)  | 781,998 | 777,970 | 764,799 | 0    | 0    | 0    |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 35,335 CFM                        |
| FLOOR AREA     | 41,874 FT <sup>2</sup>            |
| CFM1           | 0 CFM                             |
| UA             | 7447 BTU/HR-°F                    |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

### EZDOE COMPUTER RUN DEFINITION:

|         |                             |
|---------|-----------------------------|
| BASERUN | EXISTING OPERATION          |
| RUN1    | NIGHT SETBACK               |
| RUN2    | DDC CONTROL                 |
| RUN3    | ECONOMIZER                  |
| RUN4    | NIGHTTIME INFILTRATION (OA) |
| RUN5    | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      |            | ANNUAL HEATING & COOLING HOURS |            |
|--------------------|-------------------|------|------------|--------------------------------|------------|
| M-F                | 0                 | 2400 | 120 HR     | HR. ON HEATING                 | 5448 HR/YR |
| SAT.               | 0                 | 2400 | 24 HR      | HR. ON COOLING                 | 3312 HR/YR |
| SUN.               | 0                 | 2400 | 24 HR      | HR. OFF HEATING                | 0 HR/YR    |
|                    |                   |      |            | HR. OFF COOLING                | 0 HR/YR    |
|                    | TOTAL OCCUPY HR.  |      | 168 HR/WK  |                                |            |
|                    | TOTAL UNOCC. HR.  |      | 0 HR/WK    |                                |            |
|                    | ANNUAL OCCUPY HR. |      | 8760 HR/YR |                                |            |
|                    | ANNUAL UNOCC. HR. |      | 0 HR/YR    |                                |            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING

8760 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY

5448 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

3312 HR/YR

|                      |      |   |      |   |         |
|----------------------|------|---|------|---|---------|
| HRS SAVED (HTG ONLY) | 5448 | - | 5448 | = | 0 HR/YR |
| HRS SAVED (CLG ONLY) | 3312 | - | 3312 | = | 0 HR/YR |

|           |   |   |               |   |                             |
|-----------|---|---|---------------|---|-----------------------------|
| HOAUHC    | 995.86 MBtu   | - | 0 MBtu        | = | 0.00E+00 Btu/CFM-HR         |
|           | 0 CFM   | x | 0 HR/YR       |   |                             |
| HOAUH     | 995.86 MBtu   | - | 0 MBtu        | = | 0.00E+00 Btu/CFM-HR         |
|           | 0 CFM   | x | 0 HR/YR       |   |                             |
| COAUHC    | 781,998.2 kWH   | - | 0.0 kWH       | = | 0.00E+00 kWH/CFM-HR         |
|           | 0 CFM   | x | 0 HR/YR       |   |                             |
| COAUC     | 781,998.2 kWH   | - | 0.0 kWH       | = | 0.00E+00 kWH/CFM-HR         |
|           | 0 CFM   | x | 0 HR/YR       |   |                             |
| HOAOHC    | 995.86 MBtu   | - | 0 MBtu        | = | 0.00E+00 Btu/CFM-HR #DIV/0! |
|           | 0 CFM   | x | 8760 HR/YR    |   |                             |
| HOAOH     | 995.86 MBtu   | - | 0 MBtu        | = | 0.00E+00 Btu/CFM-HR #DIV/0! |
|           | 0 CFM   | x | 5448 HR/YR    |   |                             |
| COAOHC    | 781,998.2 kWH   | - | 0.0 kWH       | = | 0.00E+00 kWH/CFM-HR #DIV/0! |
|           | 0 CFM   | x | 8760 HR/YR    |   |                             |
| COAOC     | 781,998.2 kWH   | - | 0.0 kWH       | = | 0.00E+00 kWH/CFM-HR #DIV/0! |
|           | 0 CFM   | x | 3312 HR/YR    |   |                             |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               |   | = 0.17                      |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               |   | = 0.17                      |
| ECC       | 777,969.5 kWH   | - | 0.0 kWH       | = | 0.00E+00 kWH/CFM-HR         |
|           | 35335.04 CFM  | x | 3312 HR/YR    |   |                             |
| ECHC      | 777,969.5 kWH   | - | 0.0 kWH       | = | 0.00E+00 kWH/CFM-HR         |
|           | 35335.04 CFM  | x | 8760 HR/YR    |   |                             |
| NSUCHC    | 781,998.2 kWH   | - | 777,969.5 kWH | = | 0.00E+00 kWH/CFM-HR         |
|           | 35335.04 CFM  | x | 0 HR/YR       |   |                             |
| NSUCC     | 781,998.2 kWH   | - | 777,969.5 kWH | = | 0.00E+00 kWH/CFM-HR         |
|           | 35335.04 CFM  | x | 0 HR/YR       |   |                             |
| DDCCHC    | 781,998.2 kWH   | - | 764,799.3 kWH | = | 5.56E-05 kWH/CFM-HR         |
|           | 35335.04 CFM  | x | 8760 HR/YR    |   |                             |
| DDCCC     | 781,998.2 kWH   | - | 764,799.3 kWH | = | 1.47E-04 kWH/CFM-HR         |
|           | 35335.04 CFM  | x | 3312 HR/YR    |   |                             |
| NSC       | 995.86 MBtu   | - | 846.71 MBtu   | = | 2.00E+04 Btu/UA             |
|           | 7447.132 UA   |   |               |   |                             |
| DDCH      | 995.86 MBtu   | - | 743.46 MBtu   | = | 3.39E+04 Btu/UA             |
|           | 7447.132 UA   |   |               |   |                             |
| OPT       | (2 HR/DAY X 240 DAY/YR)                               |   |               |   | = 175 HR/YR                 |
|           |   |   |               |   | = 0 HR/YR                   |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               |   | = 17.5 kWH/TON              |
| OAR       | 567 HR/YR   | x | 0.01          | = | 5.67 HR/YR                  |



INPUT LOADS ..

```

$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION OF BLDG. 7618      *
        LINE-5 *ENL MEN BARRACKS W/O DIN      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
LOADS-REPORT VERIFICATION=(LV-D)
            SUMMARY=(LS-C,LS-D)
            HOURLY-DATA-SAVE = YES ..
BUILDING-LOCATION LATITUDE = 39.0
                LONGITUDE = 96.5
                ALTITUDE = 1065.
                TIME-ZONE = 6
                GROSS-AREA = 41892
                SHIELDING-COEF = 0.29
                X-REF = 0.0
                Y-REF = 0.0 ..
RUN-PERIOD  JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

```

LD_LITES   =DAY-SCHEDULE (1,4) (0.1)
                (5,6) (0.75)
                (7,9) (1.)
                (10,17) (0.5)
                (18,20) (1.)
                (21,22) (0.75,0.25)
                (23,24) (0.1) ..

LD_EQUIP   =DAY-SCHEDULE (1,5) (0.)
                (6,7) (0.5,0.75)
                (8,9) (1.)
                (10,13) (0.5,0.75,1.,0.75)
                (14,16) (0.5)
                (17,21) (1.)
                (22) (0.25)
                (23,24) (0.) ..

LD_ON      =DAY-SCHEDULE (1,24) (1.) ..

LD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

```

```
LD_WEEK_PE =DAY-SCHEDULE (1,5) (1.)
                      (6,7) (0.5)
                      (8,10) (0.1)
                      (11,13) (0.75)
                      (14,17) (0.1)
                      (18) (0.75)
                      (19,20) (0.5)
                      (21,24) (1.) ..
```

```
LD_WEND_PE =DAY-SCHEDULE (1,8) (1.)
                      (9,13) (0.75)
                      (14,18) (0.5)
                      (19,23) (0.75)
                      (24) (1.) ..
```

```
LW_ON      =WEEK-SCHEDULE (ALL) LD_ON ..
```

```
LW_OFF     =WEEK-SCHEDULE (ALL) LD_OFF ..
```

```
LW_WEEK_PE =WEEK-SCHEDULE (WD) LD_WEEK_PE
                      (WEH) LD_WEND_PE ..
```

```
LW_LITES   =WEEK-SCHEDULE (ALL) LD_LITES ..
```

```
LW_EQUIP   =WEEK-SCHEDULE (ALL) LD_EQUIP ..
```

```
$ ON 100% LOADS
```

```
L_ON       =SCHEDULE THRU DEC 31 LW_ON ..
```

```
$ OFF 100% LOADS
```

```
L_OFF      =SCHEDULE THRU DEC 31 LW_OFF ..
```

```
$ PEOPLE LOAD FOR BARRACK
```

```
L_PEOPLE   =SCHEDULE THRU DEC 31 LW_WEEK_PE ..
```

```
$ EQUIPMENT LOAD BARRACKS
```

```
L_EQUIP    =SCHEDULE THRU DEC 31 LW_EQUIP ..
```

```
$ LIGHTING SCHED BARRACKS
```

```
L_LITES    =SCHEDULE THRU DEC 31 LW_LITES ..
```

#### \$ CONSTRUCTION TYPES

```
$ EXTERIOR WALL BRICK, INSL, BRICK
```

```
WALL-1     =LAYERS      MATERIAL=(BK01,AL11,IN35,CB06,GP01) I-F-R= 0.6100
                      THICKNESS=(0.333,0.000,0.167,0.500,0.042) ..
```

```
EXWALL-1   =CONSTRUCTION LAYERS = WALL-1
                      ABSORPTANCE = 0.880
                      ROUGHNESS = 2 ..
```

## \$ SLAB FLOOR

FLOOR =CONSTRUCTION U-VALUE = 0.020  
 ABSORPTANCE = 0.610  
 ROUGHNESS = 5 ..

## \$ BUILT-UP ROOF W/INSL&amp; NO CEILING

BLT-ROOF =LAYERS MATERIAL=(HF-E2,HF-E3,HF-A3,IN02)  
 THICKNESS=(0.042,0.031,0.005,0.296) ..  
 ROOF-1 =CONSTRUCTION LAYERS = BLT-ROOF  
 ABSORPTANCE = 0.800  
 ROUGHNESS = 1 ..

## \$ CONCRETE CEILING BETW KIT &amp; MEZZ

CONC-CEL =LAYERS MATERIAL=(CC24)  
 THICKNESS=(0.333) ..  
 IN-WALL1 =CONSTRUCTION LAYERS = CONC-CEL  
 ABSORPTANCE = 0.650  
 ROUGHNESS = 5 ..

## \$ STANDARD METAL DOOR

DOOR-MET =CONSTRUCTION U-VALUE = 0.020  
 ABSORPTANCE = 0.860  
 ROUGHNESS = 5 ..

## \$ EXTERIOR WALL BRICK,AIR,BRICK

WALL-2 =LAYERS MATERIAL=(BK01,AL11,CB06,GP01) I-F-R= 0.6100  
 THICKNESS=(0.333,0.000,0.500,0.042) ..  
 EXWALL-2 =CONSTRUCTION LAYERS = WALL-2  
 ABSORPTANCE = 0.880  
 ROUGHNESS = 2 ..

## \$ BUILT-UP ROOF W/INSL &amp; CONCRETE

ROOFW/IN =LAYERS MATERIAL=(HF-E2,HF-E3,HF-A3,IN23,CC35,AL33)  
 THICKNESS=(0.042,0.031,0.005,0.167,0.500,0.000) ..  
 ROOF-2 =CONSTRUCTION LAYERS = ROOFW/IN  
 ABSORPTANCE = 0.800  
 ROUGHNESS = 1 ..

1\_PN\_STD =GLASS-TYPE GLASS-TYPE-CODE = 1  
 PANES = 1 ..  
 SG-W/STM =GLASS-TYPE GLASS-TYPE-CODE = 1  
 PANES = 2  
 GLASS-CONDUCTANCE = 0.570 ..

## \$ SPACE DESCRIPTION

inter-zone =SPACE AREA = 2802.8 VOLUME = 84084.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 15.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 3.0  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITES

FURN-WEIGHT = 1. INF-METHOD = NONE ..

U-W HEIGHT = 5.0 WIDTH = 560.6 CONS = FLOOR ..

ROOF HEIGHT = 5.0 WIDTH = 560.6 CONS = ROOF-2  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

EXTER-N =SPACE AREA = 4560.0 VOLUME = 136800.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 57.0  
PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 2.61  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITES  
EQUIP-SCHEDULE = L\_EQUP EQUIPMENT-KW = 12.9  
FURN-WEIGHT = 1. INF-METHOD = AIR-CHANGE  
AIR-CHANGES/HR = 0.76 ..

E-W HEIGHT = 30.0 WIDTH = 284.0 CONS = EXWALL-2  
AZIMUTH = 0 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 5.0 WIDTH = 10.5 G-T = SG-W/STM  
MULTIPLIER = 42.0 SETBACK = 0.3  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
OVERHANG-A = 10. OVERHANG-W = 30.  
OVERHANG-D = 2.5 ..

U-W HEIGHT = 10.0 WIDTH = 456.0 CONS = FLOOR ..

ROOF HEIGHT = 10.0 WIDTH = 456.0 CONS = ROOF-2  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

EXTER-S =SPACE AREA = 4985.0 VOLUME = 149550.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 58.0  
PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 2.61  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITES  
EQUIP-SCHEDULE = L\_EQUP EQUIPMENT-KW = 14.1  
FURN-WEIGHT = 1. INF-METHOD = AIR-CHANGE  
AIR-CHANGES/HR = 0.76 ..

E-W HEIGHT = 30.0 WIDTH = 284.0 CONS = EXWALL-2  
AZIMUTH = 180 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 5.0 WIDTH = 10.5 G-T = SG-W/STM  
MULTIPLIER = 42.0 SETBACK = 0.3  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
OVERHANG-A = 10. OVERHANG-W = 30.  
OVERHANG-D = 2.5 ..

U-W HEIGHT = 10.0 WIDTH = 498.5 CONS = FLOOR ..

ROOF HEIGHT = 10.0 WIDTH = 498.5 CONS = ROOF-2  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

EXTER-E =SPACE AREA = 805.0 VOLUME = 24150.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 10.0  
PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 2.61  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITES  
EQUIP-SCHEDULE = L\_EQUP EQUIPMENT-KW = 2.28  
FURN-WEIGHT = 1. INF-METHOD = AIR-CHANGE  
AIR-CHANGES/HR = 0.76 ..

E-W HEIGHT = 30.0 WIDTH = 56.7 CONS = EXWALL-2  
AZIMUTH = 90 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.5 WIDTH = 7.8 G-T = SG-W/STM  
SETBACK = 0.3 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 OVERHANG-A = 10.  
OVERHANG-W = 30. OVERHANG-D = 2.5 ..

U-W HEIGHT = 10.0 WIDTH = 80.5 CONS = FLOOR ..

ROOF HEIGHT = 10.0 WIDTH = 80.5 CONS = ROOF-2  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

EXTER-W =SPACE AREA = 805.0 VOLUME = 24150.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 10.0  
PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 2.61  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITES  
EQUIP-SCHEDULE = L\_EQUP EQUIPMENT-KW = 2.28  
FURN-WEIGHT = 1. INF-METHOD = AIR-CHANGE  
AIR-CHANGES/HR = 0.76 ..

E-W HEIGHT = 30.0 WIDTH = 56.7 CONS = EXWALL-2  
AZIMUTH = 270 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.5 WIDTH = 7.8 G-T = SG-W/STM  
SETBACK = 0.3 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 OVERHANG-A = 10.  
OVERHANG-W = 30. OVERHANG-D = 2.5 ..

U-W HEIGHT = 10.0 WIDTH = 80.5 CONS = FLOOR ..

ROOF HEIGHT = 10.0 WIDTH = 80.5 CONS = ROOF-2  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..  
COMPUTE LOADS ..



INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION OF BLDG. 7618      *
        LINE-5 *ENL MEN BARRACKS W/O DIN      * ..

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE  (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..
SD_W_HT_F  =DAY-SCHEDULE  (1,24) (74.) ..
SD_S_CL_F  =DAY-SCHEDULE  (1,24) (72.) ..
SD_W_CL_F  =DAY-SCHEDULE  (1,24) (75.) ..
SD_S_HT_F  =DAY-SCHEDULE  (1,24) (71.) ..

SW_ON      =WEEK-SCHEDULE  (ALL) SD_ON ..

SW_OFF     =WEEK-SCHEDULE  (ALL) SD_OFF ..

SW_W_HT_F  =WEEK-SCHEDULE  (ALL) SD_W_HT_F ..

SW_S_CL_F  =WEEK-SCHEDULE  (ALL) SD_S_CL_F ..

SW_W_CL_F  =WEEK-SCHEDULE  (ALL) SD_W_CL_F ..

SW_S_HT_F  =WEEK-SCHEDULE  (ALL) SD_S_HT_F ..

```

## \$ FULL ON SYSTEM

```

S_ON      =SCHEDULE THRU DEC 31 SW_ON ..

```

## \$ FULL OFF SYSTEM

```

S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..

```

## \$ COOLING SEASON

```

S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
            THRU OCT  1 SW_ON
            THRU DEC 31 SW_OFF ..

```

## \$ HEATING SET TEMP

```
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_W_HT_F
                THRU OCT  1 SW_S_HT_F
                THRU DEC 31 SW_W_HT_F ..
```

## \$ COOLING SET TEMP

```
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_W_CL_F
                THRU OCT  1 SW_S_CL_F
                THRU DEC 31 SW_W_CL_F ..
```

## \$ HEATING SEASON

```
S_HT_SCHED =SCHEDULE THRU MAY 15 SW_ON
                THRU OCT  1 SW_OFF
                THRU DEC 31 SW_ON ..
```

```
S_HRLY-RPT =SCHEDULE THRU JAN 10 SW_OFF
                THRU JAN 11 SW_ON
                THRU JUN 17 SW_OFF
                THRU JUN 18 SW_ON
                THRU DEC 31 SW_OFF ..
```

## \$ ZONE DESCRIPTION

```
inter-zone =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
                   HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
                   ZONE-TYPE = CONDITIONED
                   THERMOSTAT-TYPE = PROPORTIONAL  THROTTLING-RANGE = 1.0
                   SIZING-OPTION = FROM-LOADS ..
```

```
EXTER-N      =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
                   HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
                   ZONE-TYPE = CONDITIONED
                   THERMOSTAT-TYPE = PROPORTIONAL  THROTTLING-RANGE = 1.0
                   SIZING-OPTION = FROM-LOADS ..
```

```
EXTER-S      =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
                   HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
                   ZONE-TYPE = CONDITIONED
                   THERMOSTAT-TYPE = PROPORTIONAL  THROTTLING-RANGE = 1.0
                   SIZING-OPTION = FROM-LOADS ..
```

```
EXTER-E      =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
                   HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
                   ZONE-TYPE = CONDITIONED
                   THERMOSTAT-TYPE = PROPORTIONAL  THROTTLING-RANGE = 1.0
                   SIZING-OPTION = FROM-LOADS ..
```

```
EXTER-W      =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
                   HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
                   ZONE-TYPE = CONDITIONED
                   THERMOSTAT-TYPE = PROPORTIONAL  THROTTLING-RANGE = 1.0
                   SIZING-OPTION = FROM-LOADS ..
```

## \$ SYSTEM DESCRIPTION

```

MULTIZONE =SYSTEM      SYSTEM-TYPE = MZS
                        MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
                        HEATING-SCHEDULE = S_HT_SCHED
                        COOLING-SCHEDULE = S_CL_SCHED  OA-CONTROL = FIXED
                        SUPPLY-CFM = 33976.  RATED-CFM = 33976.
                        MAX-OA-FRACTION = 0.0  SUPPLY-DELTA-T = 2.7
                        SUPPLY-KW = 0.00088
                        MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
                        MAX-FAN-RATIO = 1.0  MIN-FAN-RATIO = 0.2
                        NIGHT-CYCLE-CTRL = STAY-OFF  NIGHT-VENT-DT = 0.0
                        MIN-CFM-RATIO = 1.0  COOLING-CAPACITY = 1052000.
                        COOL-SH-CAP = 865200.  HEATING-CAPACITY = -1014400.
                        RETURN-AIR-PATH = DUCT
                        ZONE-NAMES = (inter-zone, EXTER-N, EXTER-S,
                                      EXTER-E, EXTER-W) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

RPT_#1  =REPORT-BLOCK VARIABLE-TYPE = inter-zone
          VARIABLE-LIST = (17,18,7,6) ..
rpt_#2  =REPORT-BLOCK VARIABLE-TYPE = EXTER-N
          VARIABLE-LIST = (17,18,7,6) ..
AHU-RPT =REPORT-BLOCK VARIABLE-TYPE = MULTIZONE
          VARIABLE-LIST = (3,5,6,18,19) ..
INTERZN = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (RPT_#1)
..
EXT_N_ZN = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (rpt_#2)
..
AHU_REPORT = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (AHU-RPT)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION OF BLDG. 7618      *
        LINE-5 *ENL MEN BARRACKS W/O DIN      * ..

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..

```

PLANT-REPORT      VERIFICATION=(PV-A)  
                     SUMMARY=(PS-B,BEPS)  
                     HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_ON      =DAY-SCHEDULE (1,24) (1.) ..

PD\_OFF      =DAY-SCHEDULE (1,24) (0.) ..

PW\_OFF      =WEEK-SCHEDULE (ALL) PD\_OFF ..

PW\_ON      =WEEK-SCHEDULE (ALL) PD\_ON ..

## \$ HEATING SEASON

P\_HEAT      =SCHEDULE THRU MAY 15 PW\_ON  
                     THRU OCT 1 PW\_OFF  
                     THRU DEC 31 PW\_ON ..

## \$ COOLING SEASON

P\_COOL      =SCHEDULE THRU MAY 15 PW\_OFF  
                     THRU OCT 1 PW\_ON  
                     THRU DEC 31 PW\_OFF ..

## \$ EQUIPMENT DESCRIPTION

BOILER-HW   =PLANT-EQUIPMENT    TYPE = HW-BOILER  
                     SIZE = -999. ..

CHILLER-RC =PLANT-EQUIPMENT    TYPE = HERM-REC-CHLR  
                     SIZE = -999.    INSTALLED-NUMBER = 2  
                     MAX-NUMBER-AVAIL = 2 ..

PLANT-PARAMETERS      BOILER-FUEL = NATURAL-GAS    HERM-REC-COND-TYPE = AIR    ..

ENERGY-RESOURCE      RESOURCE = ELECTRICITY ..  
 ENERGY-RESOURCE      RESOURCE = NATURAL-GAS ..

HEAT-SESN   =LOAD-ASSIGNMENT    TYPE = HEATING  
                     OPERATION-MODE = RUN-NEEDED  
                     LOAD-RANGE =      0.000  
                     PLANT-EQUIPMENT = BOILER-HW  
                     NUMBER =      1 ..

COOL-SEASO =LOAD-ASSIGNMENT    TYPE = COOLING  
                     OPERATION-MODE = RUN-NEEDED  
                     LOAD-RANGE =      0.000  
                     PLANT-EQUIPMENT = CHILLER-RC  
                     NUMBER =      2 ..

Path: C:\ELITE\EZDOE

File: MOD7618 .INP 19,061 .a.. 5-11-95 13:43:36

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END ..

COMPUTE PLANT ..

STOP ..

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 13:43:41 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION OF BLDG. 7618 ENL MEN BARRACKS W/O DIN  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

NUMBER OF EXTERIOR SURFACES 9 RECTANGULAR 9 OTHER 0  
 (U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED )

| SURFACE    | SPACE | U-VALUE<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | W A L L<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | W A L L + G L A S S<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) | AZIMUTH   |
|------------|-------|----------------------------|----------------|----------------------------|----------------------------|----------------|----------------------------|--|----------------|-----------|
| EXTER-N    |       | 0.487                      | 2205.00        | 0.258                      |                            | 6315.00        | 0.317                      |  | 8520.00        | NORTH     |
| EXTER-E    |       | 0.487                      | 35.10          | 0.258                      |                            | 1665.90        | 0.263                      |  | 1701.00        | EAST      |
| EXTER-S    |       | 0.487                      | 2205.00        | 0.258                      |                            | 6315.00        | 0.317                      |  | 8520.00        | SOUTH     |
| EXTER-W    |       | 0.487                      | 35.10          | 0.258                      |                            | 1665.90        | 0.263                      |  | 1701.00        | WEST      |
| EXTER-S    |       | 0.000                      | 0.00           | 0.064                      |                            | 4985.00        | 0.064                      |  | 4985.00        | ROOF      |
| EXTER-N    |       | 0.000                      | 0.00           | 0.064                      |                            | 4560.00        | 0.064                      |  | 4560.00        | ROOF      |
| EXTER-E    |       | 0.000                      | 0.00           | 0.064                      |                            | 805.00         | 0.064                      |  | 805.00         | ROOF      |
| inter-zone |       | 0.000                      | 0.00           | 0.064                      |                            | 2803.00        | 0.064                      |  | 2803.00        | ROOF      |
| EXTER-W    |       | 0.000                      | 0.00           | 0.064                      |                            | 805.00         | 0.064                      |  | 805.00         | ROOF      |
| inter-zone |       | 0.000                      | 0.00           | 0.020                      |                            | 2803.00        | 0.020                      |  | 2803.00        | UNDERGRND |
| EXTER-N    |       | 0.000                      | 0.00           | 0.020                      |                            | 4560.00        | 0.020                      |  | 4560.00        | UNDERGRND |
| EXTER-S    |       | 0.000                      | 0.00           | 0.020                      |                            | 4985.00        | 0.020                      |  | 4985.00        | UNDERGRND |
| EXTER-E    |       | 0.000                      | 0.00           | 0.020                      |                            | 805.00         | 0.020                      |  | 805.00         | UNDERGRND |
| EXTER-W    |       | 0.000                      | 0.00           | 0.020                      |                            | 805.00         | 0.020                      |  | 805.00         | UNDERGRND |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 13:43:41 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION OF BLDG. 7618 ENL MEN BARRACKS W/O DIN  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

|             | AVERAGE<br>U-VALUE/GLASS<br>(BTU/HR-SQFT-F) | AVERAGE<br>U-VALUE/WALLS<br>(BTU/HR-SQFT-F) | AVERAGE U-VALUE<br>WALLS+GLASS<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | OPAQUE<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) |
|-------------|---|---|---|-------------------------|--------------------------|--------------------------------|
| NORTH       | 0.487                                       | 0.258                                       | 0.317   | 2205.00                 | 6315.00                  | 8520.00                        |
| EAST        | 0.487                                       | 0.258                                       | 0.263   | 35.10                   | 1665.90                  | 1701.00                        |
| SOUTH       | 0.487                                       | 0.258                                       | 0.317   | 2205.00                 | 6315.00                  | 8520.00                        |
| WEST        | 0.487                                       | 0.258                                       | 0.263   | 35.10                   | 1665.90                  | 1701.00                        |
| ROOF        | 0.000                                       | 0.064                                       | 0.064   | 0.00                    | 13958.00                 | 13958.00                       |
| ALL WALLS   | 0.487                                       | 0.258                                       | 0.308   | 4480.20                 | 15961.80                 | 20442.00                       |
| WALLS+ROOFS | 0.487                                       | 0.167                                       | 0.209   | 4480.20                 | 29919.80                 | 34400.00                       |
| UNDERGRND   | 0.000                                       | 0.020                                       | 0.020   | 0.00                    | 13958.00                 | 13958.00                       |
| BUILDING    | 0.487                                       | 0.120                                       | 0.154   | 4480.20                 | 43877.80                 | 48358.00                       |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 13:43:41 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION OF BLDG. 7618 ENL MEN BARRACKS W/O DIN  
 REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS

\*\*\* BUILDING \*\*\*

FLOOR AREA 13958 SQFT 1297 SQMT  
 VOLUME 418734 CUFT 11859 CUMT

TIME DRY-BULB TEMP WET-BULB TEMP  
 AUG 24 7PM 33C 24C  
 92F 76F  
 COOLING LOAD  
 HEATING LOAD  
 JAN 4 3AM 8F -13C  
 7F -14C

|                      | SENSIBLE (KBTU/H) ( KW ) |            | LATENT (KBTU/H) ( KW ) |         | SENSIBLE (KBTU/H) ( KW ) |            |
|----------------------|--------------------------|------------|------------------------|---------|--------------------------|------------|
| WALLS                | 69.083                   | 20.233     | 0.000                  | 0.000   | -230.041                 | -67.373    |
| ROOFS                | 19.337                   | 5.663      | 0.000                  | 0.000   | -39.155                  | -11.467    |
| GLASS CONDUCTION     | 40.916                   | 11.983     | 0.000                  | 0.000   | -151.937                 | -44.499    |
| GLASS SOLAR          | 99.635                   | 29.181     | 0.000                  | 0.000   | 6.654                    | 1.949      |
| DOOR                 | 0.000                    | 0.000      | 0.000                  | 0.000   | 0.000                    | 0.000      |
| INTERNAL SURFACES    | 0.000                    | 0.000      | 0.000                  | 0.000   | 0.000                    | 0.000      |
| UNDERGROUND SURFACES | -1.321                   | -0.387     | 0.000                  | 0.000   | -6.405                   | -1.876     |
| OCCUPANTS TO SPACE   | 27.009                   | 7.910      | 46.875                 | 13.729  | 46.820                   | 13.712     |
| LIGHT TO SPACE       | 104.108                  | 30.491     | 0.000                  | 0.000   | 24.551                   | 7.190      |
| EQUIPMENT TO SPACE   | 96.808                   | 28.353     | 0.000                  | 0.000   | 14.187                   | 4.155      |
| PROCESS TO SPACE     | 0.000                    | 0.000      | 0.000                  | 0.000   | 0.000                    | 0.000      |
| INFILTRATION         | 188.739                  | 55.277     | 318.441                | 93.264  | -659.139                 | -193.045   |
| TOTAL                | 644.316                  | 188.704    | 365.316                | 106.992 | -994.467                 | -291.254   |
| TOTAL LOAD           | 1009.632                 | KBTU/H     | 295.696                | KW      | -994.467                 | KBTU/H     |
| TOTAL LOAD / AREA    | 72.33                    | BTU/H.SQFT | 228.034                | W /SQMT | 71.248                   | BTU/H.SQFT |

KW W /SQMT

\*\*\*\*\*  
 \* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR \*  
 \* LOADS \*  
 \* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION \*  
 \* IN CONSIDERATION \*  
 \*\*\*\*\*

| EMC ENGINEERS INC. EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 13:43:41 SDL RUN 1 |                       |                   |                |                |                       |                   |                |                |                     |                        |
|---|-----------------------|-------------------|----------------|----------------|-----------------------|-------------------|----------------|----------------|---------------------|------------------------|
| DENVER, CO 80227 BASELINE SIMULATION OF BLDG. 7618 ENL MEN BARRACKS W/O DIN                     |                       |                   |                |                |                       |                   |                |                |                     |                        |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MULTIZONE TOPEKA, KS                              |                       |                   |                |                |                       |                   |                |                |                     |                        |
| MONTH   | COOLING               |                   |                |                | HEATING               |                   |                |                | ELEC                |                        |
|   | COOLING ENERGY (MBTU) | TIME OF MAX DY HR | DRY- BULB TEMP | WET- BULB TEMP | HEATING ENERGY (MBTU) | TIME OF MAX DY HR | DRY- BULB TEMP | WET- BULB TEMP | TRICAL ENERGY (KWH) | MAXIMUM ELEC LOAD (KW) |
| JAN   | 0.00000               |                   |                |                | -185.666              | 4                 | 3              | 8.F 7.F        | 50190.              | 98.953                 |
| FEB   | 0.00000               |                   |                |                | -118.677              | 1                 | 23             | 17.F 15.F      | 45333.              | 98.953                 |
| MAR   | 0.00000               |                   |                |                | -81.129               | 3                 | 4              | 16.F 13.F      | 50190.              | 98.953                 |
| APR   | 0.00000               |                   |                |                | -16.407               | 4                 | 10             | 34.F 31.F      | 48571.              | 98.953                 |
| MAY   | 162.08939             | 16                | 2              | 62.F 59.F      | -3.089                | 3                 | 22             | 58.F 56.F      | 50190.              | 98.953                 |
| JUN   | 354.96628             | 19                | 19             | 86.F 75.F      | 0.000                 |                   |                |                | 48571.              | 98.953                 |
| JUL   | 416.69571             | 2                 | 19             | 84.F 77.F      | 0.000                 |                   |                |                | 50190.              | 98.953                 |
| AUG   | 410.92154             | 24                | 19             | 92.F 76.F      | 0.000                 |                   |                |                | 48571.              | 98.953                 |
| SEP   | 276.45010             | 5                 | 17             | 90.F 77.F      | 0.000                 |                   |                |                | 50190.              | 98.953                 |
| OCT   | 6.72422               | 1                 | 18             | 83.F 68.F      | -13.900               | 31                | 7              | 43.F 39.F      | 50190.              | 98.953                 |
| NOV   | 0.00000               |                   |                |                | -43.304               | 2                 | 4              | 17.F 15.F      | 48571.              | 98.953                 |
| DEC   | 0.00000               |                   |                |                | -164.413              | 8                 | 10             | 24.F 22.F      | 50190.              | 98.953                 |
| TOTAL   | 1627.847              |                   |                |                | -626.590              |                   |                |                | 590934.             |                        |
| MAX   |                       |                   |                |                |                       |                   |                |                | -883.762            | 98.953                 |

H5-15

| EMC ENGINEERS INC. EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 13:43:41 SDL RUN 1 |                    |                    |                      |                      |                                |                          |                |  |                                    |
|---|--------------------|--------------------|----------------------|----------------------|--------------------------------|--------------------------|----------------|--|------------------------------------|
| DENVER, CO 80227 BASELINE SIMULATION OF BLDG. 7618 ENL MEN BARRACKS W/O DIN 13:43:41            |                    |                    |                      |                      |                                |                          |                |  |                                    |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MULTIZONE TOPEKA, KS                                 |                    |                    |                      |                      |                                |                          |                |  |                                    |
| MONTH   | NUMBER OF HOURS    |                    |                      |                      | COINCIDENT LOADS               |                          |                |  | ELECTRIC LOAD AT COOLING PEAK (KW) |
|   | HOURS COOLING LOAD | HOURS HEATING LOAD | HOURS HEATING AVAIL. | HOURS COOLING AVAIL. | HOURS FANS ON CYCLE ON VENTING | HOURS NIGHT WHEN FANS ON | HOURS FLOATING | HEATING LOAD AT COOLING PEAK (KBTU/HR) |                                    |
| JAN   | 0                  | 744                | 0                    | 744                  | 0                              | 0                        | 0              | -136.753                               | 33.650                             |
| FEB   | 0                  | 672                | 0                    | 672                  | 0                              | 0                        | 0              | -118.913                               | 33.650                             |
| MAR   | 0                  | 744                | 0                    | 744                  | 0                              | 0                        | 0              | -193.627                               | 33.650                             |
| APR   | 0                  | 720                | 0                    | 0                    | 0                              | 0                        | 0              | -23.532                                | 33.650                             |
| MAY   | 384                | 360                | 0                    | 384                  | 0                              | 0                        | 0              | 0.000                                  | 33.650                             |
| JUN   | 720                | 0                  | 0                    | 720                  | 0                              | 0                        | 0              | 0.000                                  | 98.953                             |
| JUL   | 744                | 0                  | 0                    | 744                  | 0                              | 0                        | 0              | 0.000                                  | 98.953                             |
| AUG   | 744                | 0                  | 0                    | 744                  | 0                              | 0                        | 0              | 0.000                                  | 98.953                             |
| SEP   | 718                | 0                  | 0                    | 720                  | 0                              | 0                        | 0              | 0.000                                  | 80.199                             |
| OCT   | 24                 | 720                | 0                    | 24                   | 0                              | 0                        | 0              | 0.000                                  | 98.953                             |
| NOV   | 0                  | 720                | 0                    | 744                  | 0                              | 0                        | 0              | -226.291                               | 33.650                             |
| DEC   | 0                  | 744                | 0                    | 744                  | 0                              | 0                        | 0              | -237.822                               | 33.650                             |
| ANNUAL  | 3334               | 5424               | 2                    | 3336                 | 0                              | 0                        | 0              |  |                                    |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 13:43:41 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION OF BLDG. 7618 ENL MEN BARRACKS W/O DIN  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO                   | UTILITY-<br>TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR |
|----------------------|--|---|---|
| JAN                  | 184.359<br>360.717<br>28/ 8                    | 184.359<br>360.717<br>28/ 8                       | 277.371<br>1112.063<br>4/ 3                       |
| FEB                  | 165.654<br>360.717<br>27/18                    | 165.654<br>360.717<br>27/18                       | 189.359<br>917.868<br>1/23                        |
| MAR                  | 179.606<br>360.717<br>31/ 9                    | 179.606<br>360.717<br>31/ 9                       | 130.718<br>869.264<br>3/ 4                        |
| APR                  | 169.986<br>360.717<br>4/ 9                     | 169.986<br>360.717<br>4/ 9                        | 33.577<br>499.429<br>4/10                         |
| MAY                  | 231.126<br>658.803<br>30/18                    | 231.126<br>658.803<br>30/18                       | 8.511<br>149.754<br>3/22                          |
| JUN                  | 292.952<br>658.410<br>19/19                    | 292.952<br>658.410<br>19/19                       | 0.000<br>0.000<br>30/ 1                           |
| JUL                  | 318.887<br>680.153<br>23/18                    | 318.887<br>680.153<br>23/18                       | 0.000<br>0.000<br>31/ 1                           |
| AUG                  | 322.748<br>689.452<br>24/18                    | 322.748<br>689.452<br>24/18                       | 0.000<br>0.000<br>31/ 1                           |
| SEP                  | 269.572<br>678.056<br>5/18                     | 269.572<br>678.056<br>5/18                        | 0.000<br>0.000<br>30/ 1                           |
| OCT                  | 177.996<br>577.426<br>1/18                     | 177.996<br>577.426<br>1/18                        | 29.458<br>448.138<br>31/ 7                        |
| NOV                  | 172.059<br>360.717<br>30/ 9                    | 172.059<br>360.717<br>30/ 9                       | 76.033<br>539.579<br>2/ 4                         |
| DEC                  | 183.931<br>360.717<br>31/ 9                    | 183.931<br>360.717<br>31/ 9                       | 250.832<br>946.975<br>8/10                        |
| ONE YEAR<br>USE/PEAK | 2668.876<br>689.452                            | 2668.876<br>689.452                               | 995.860<br>1112.063                               |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 13:43:41 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION OF BLDG. 7618 ENL MEN BARRACKS W/O DIN  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 42.80       | 995.86      |
| SPACE COOL      | 547.49      | 0.00        |
| HVAC AUX        | 955.23      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 612.35      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 511.10      | 0.00        |
| TOTAL           | 2668.96     | 995.86      |

TOTAL SITE ENERGY 3664.74 MBTU 87.5 KBTU/SQFT-YR GROSS-AREA 262.6 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 9010.50 MBTU 215.1 KBTU/SQFT-YR GROSS-AREA 645.6 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.3  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



## INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #1 NIGHT SETBACK FOR BLDG. 7618      *
        LINE-5 *ENL MEN BARRACKS W/O DIN      * ..

ABORT      ERRORS      ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES      ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE  (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..
SD_W_HT_F  =DAY-SCHEDULE  (1,4) (65.)
                (5,21) (74.)
                (22,24) (65.) ..
SD_S_CL_F  =DAY-SCHEDULE  (1,24) (72.) ..
SD_W_CL_F  =DAY-SCHEDULE  (1,4) (66.)
                (5,21) (75.)
                (22,24) (66.) ..
SD_S_HT_F  =DAY-SCHEDULE  (1,24) (71.) ..

SW_ON      =WEEK-SCHEDULE  (ALL) SD_ON      ..
SW_OFF     =WEEK-SCHEDULE  (ALL) SD_OFF     ..
SW_W_HT_F  =WEEK-SCHEDULE  (ALL) SD_W_HT_F ..
SW_S_CL_F  =WEEK-SCHEDULE  (ALL) SD_S_CL_F ..
SW_W_CL_F  =WEEK-SCHEDULE  (ALL) SD_W_CL_F ..
SW_S_HT_F  =WEEK-SCHEDULE  (ALL) SD_S_HT_F ..

```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON      ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF     ..
```

## \$ COOLING SEASON

```
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
```

THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
THRU OCT 1 SW\_S\_HT\_F  
THRU DEC 31 SW\_W\_HT\_F ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
THRU OCT 1 SW\_S\_CL\_F  
THRU DEC 31 SW\_W\_CL\_F ..

## \$ HEATING SEASON

S\_HT\_SCHED =SCHEDULE THRU MAY 15 SW\_ON  
THRU OCT 1 SW\_OFF  
THRU DEC 31 SW\_ON ..

S\_HRLY-RPT =SCHEDULE THRU JAN 10 SW\_OFF  
THRU JAN 11 SW\_ON  
THRU JUN 17 SW\_OFF  
THRU JUN 18 SW\_ON  
THRU DEC 31 SW\_OFF ..

## \$ ZONE DESCRIPTION

inter-zone =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 1.0  
SIZING-OPTION = FROM-LOADS ..

EXTER-N =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 1.0  
SIZING-OPTION = FROM-LOADS ..

EXTER-S =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 1.0  
SIZING-OPTION = FROM-LOADS ..

EXTER-E =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 1.0  
SIZING-OPTION = FROM-LOADS ..

EXTER-W =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 1.0

SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MULTIZONE =SYSTEM      SYSTEM-TYPE = MZS  
                          MAX-SUPPLY-T = 120.0   MIN-SUPPLY-T = 55.0  
                          HEATING-SCHEDULE = S\_HT\_SCHED  
                          COOLING-SCHEDULE = S\_CL\_SCHED  
                          HEAT-CONTROL = COLDEST   COOL-CONTROL = WARMEST  
                          OA-CONTROL = FIXED      SUPPLY-CFM = 33976.  
                          RATED-CFM = 33976.      MAX-OA-FRACTION = 0.0  
                          SUPPLY-DELTA-T = 2.7      SUPPLY-KW = 0.00088  
                          MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
                          MAX-FAN-RATIO = 1.0   MIN-FAN-RATIO = 0.2  
                          NIGHT-CYCLE-CTRL = STAY-OFF   NIGHT-VENT-DT = 0.0  
                          MIN-CFM-RATIO = 1.0      COOLING-CAPACITY = 1052000.  
                          COOL-SH-CAP = 865200.      HEATING-CAPACITY = -1014400.  
                          RETURN-AIR-PATH = DUCT  
                          ZONE-NAMES = (inter-zone, EXTER-N, EXTER-S,  
    EXTER-E, EXTER-W) ..

## \$ HOURLY REPORT DESCRIPTION

RPT\_#1      =REPORT-BLOCK VARIABLE-TYPE = inter-zone  
                          VARIABLE-LIST = (17,18,7,6) ..  
 rpt\_#2      =REPORT-BLOCK VARIABLE-TYPE = EXTER-N  
                          VARIABLE-LIST = (17,18,7,6) ..  
 AHU-RPT     =REPORT-BLOCK VARIABLE-TYPE = MULTIZONE  
                          VARIABLE-LIST = (3,5,6,18,19) ..  
 INTERZN     = HOURLY-REPORT   REPORT-SCHEDULE = S\_HRLY-RPT  
                          REPORT-BLOCK = (RPT\_#1)  
 ..  
 EXT\_N\_ZN    = HOURLY-REPORT   REPORT-SCHEDULE = S\_HRLY-RPT  
                          REPORT-BLOCK = (rpt\_#2)  
 ..  
 AHU\_REPORT = HOURLY-REPORT   REPORT-SCHEDULE = S\_HRLY-RPT  
                          REPORT-BLOCK = (AHU-RPT)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..

INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E   P L A N T S   I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

|       |          |   |           |       |   |
|-------|----------|---|-----------|-------|---|
| TITLE | LINE-1 * | EMC                                     | ENGINEERS | INC.  | * |
|       | LINE-2 * | EZDOE - ELITE SOFTWARE DEVELOPMENT INC* |           |       |   |
|       | LINE-3 * | DENVER,                                 | CO        | 80227 | * |

LINE-4 \*RUN #1 NIGHT SETBACK FOR BLDG. 7618 \*

LINE-5 \*ENL MEN BARRACKS W/O DIN \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
 SUMMARY=(PS-B,BEPS)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..

PD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

PW\_OFF =WEEK-SCHEDULE (ALL) PD\_OFF ..

PW\_ON =WEEK-SCHEDULE (ALL) PD\_ON ..

## \$ HEATING SEASON

P\_HEAT =SCHEDULE THRU MAY 15 PW\_ON  
 THRU OCT 1 PW\_OFF  
 THRU DEC 31 PW\_ON ..

## \$ COOLING SEASON

P\_COOL =SCHEDULE THRU MAY 15 PW\_OFF  
 THRU OCT 1 PW\_ON  
 THRU DEC 31 PW\_OFF ..

## \$ EQUIPMENT DESCRIPTION

BOILER-HW =PLANT-EQUIPMENT TYPE = HW-BOILER  
 SIZE = -999. ..

CHILLER-RC =PLANT-EQUIPMENT TYPE = HERM-REC-CHLR  
 SIZE = -999. INSTALLED-NUMBER = 2  
 MAX-NUMBER-AVAIL = 2 ..

PLANT-PARAMETERS BOILER-FUEL = NATURAL-GAS HERM-REC-COND-TYPE = AIR ..

ENERGY-RESOURCE RESOURCE = ELECTRICITY ..  
 ENERGY-RESOURCE RESOURCE = NATURAL-GAS ..

HEAT-SESN =LOAD-ASSIGNMENT TYPE = HEATING  
 OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000  
 PLANT-EQUIPMENT = BOILER-HW  
 NUMBER = 1 ..

COOL-SEASO =LOAD-ASSIGNMENT TYPE = COOLING

OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000

PLANT-EQUIPMENT = CHILLER-RC

NUMBER = 2 ..

END ..

COMPUTE PLANT ..

STOP ..





EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 13:59:13 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #1 NIGHT SETBACK FOR BLDG. 7618 ENL MEN BARRACKS W/O DIN  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>182.626<br>359.351<br>31/ 8 | NATURAL-GAS<br>243.540<br>1045.567<br>4/ 5 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 182.626<br>359.351<br>31/ 8                | 243.540<br>1045.567<br>4/ 5                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 163.878<br>359.351<br>28/ 9                | 160.019<br>800.165<br>2/ 6                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 177.887<br>359.351<br>31/ 9                | 108.572<br>914.746<br>3/ 5                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 168.399<br>359.351<br>5/ 9                 | 25.983<br>505.753<br>4/10                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 230.223<br>655.958<br>30/18                | 6.447<br>149.140<br>3/22                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 292.852<br>658.505<br>19/19                | 0.000<br>0.000<br>30/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 318.677<br>682.260<br>23/18                | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 322.328<br>689.613<br>24/18                | 0.000<br>0.000<br>31/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 269.279<br>680.666<br>5/18                 | 0.000<br>0.000<br>30/ 1                    |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 176.360<br>526.842<br>1/18                 | 23.133<br>532.646<br>31/ 5                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 170.451<br>359.351<br>30/ 9                | 61.304<br>607.190<br>2/ 5                  |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 182.139<br>359.351<br>31/20                | 217.718<br>999.283<br>8/10                 |
|     | ONE YEAR<br>USE/PEAK                             | 2655.101<br>689.613                        | 846.715<br>1045.567                        |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 13:59:13 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 7618 ENL MEN BARRACKS W/O DIN  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 35.23       | 846.71      |
| SPACE COOL      | 546.22      | 0.00        |
| HVAC AUX        | 950.30      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 612.35      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 511.10      | 0.00        |
| TOTAL           | 2655.21     | 846.71      |

TOTAL SITE ENERGY 3501.82 MBTU 83.6 KBTU/SQFT-YR GROSS-AREA 250.9 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 8819.99 MBTU 210.5 KBTU/SQFT-YR GROSS-AREA 631.9 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.4  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

INPUT SYSTEMS ..

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$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

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## \$ GENERAL PROJECT DATA

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TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #2 DDC CONTROL OF BLDG. 7618      *
        LINE-5 *ENL MEN BARRACKS W/O DIN      * ..

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
SD_W_HT_F  =DAY-SCHEDULE (1,24) (70.) ..
SD_S_CL_F  =DAY-SCHEDULE (1,24) (76.) ..
SD_W_CL_F  =DAY-SCHEDULE (1,24) (71.) ..
SD_S_HT_F  =DAY-SCHEDULE (1,24) (75.) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..

SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_W_HT_F  =WEEK-SCHEDULE (ALL) SD_W_HT_F ..

SW_S_CL_F  =WEEK-SCHEDULE (ALL) SD_S_CL_F ..

SW_W_CL_F  =WEEK-SCHEDULE (ALL) SD_W_CL_F ..

SW_S_HT_F  =WEEK-SCHEDULE (ALL) SD_S_HT_F ..

```

## \$ FULL ON SYSTEM

```

S_ON      =SCHEDULE THRU DEC 31 SW_ON ..

```

## \$ FULL OFF SYSTEM

```

S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..

```

## \$ COOLING SEASON

```

S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
            THRU OCT 1 SW_ON
            THRU DEC 31 SW_OFF ..

```

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
THRU OCT 1 SW\_S\_HT\_F  
THRU DEC 31 SW\_W\_HT\_F ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
THRU OCT 1 SW\_S\_CL\_F  
THRU DEC 31 SW\_W\_CL\_F ..

## \$ HEATING\_SEASON

S\_HT\_SCHD =SCHEDULE THRU MAY 15 SW\_ON  
THRU OCT 1 SW\_OFF  
THRU DEC 31 SW\_ON ..

S\_HRLY-RPT =SCHEDULE THRU JAN 10 SW\_OFF  
THRU JAN 11 SW\_ON  
THRU JUN 17 SW\_OFF  
THRU JUN 18 SW\_ON  
THRU DEC 31 SW\_OFF ..

## \$ ZONE DESCRIPTION

inter-zone =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 1.0  
SIZING-OPTION = FROM-LOADS ..

EXTER-N =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 1.0  
SIZING-OPTION = FROM-LOADS ..

EXTER-S =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 1.0  
SIZING-OPTION = FROM-LOADS ..

EXTER-E =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 1.0  
SIZING-OPTION = FROM-LOADS ..

EXTER-W =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 1.0  
SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

```

MULTIZONE =SYSTEM      SYSTEM-TYPE = MZS
                        MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
                        HEATING-SCHEDULE = S_HT_SCHD
                        COOLING-SCHEDULE = S_CL_SCHD
                        HEAT-CONTROL = COLDEST  COOL-CONTROL = WARMEST
                        OA-CONTROL = FIXED  SUPPLY-CFM = 33976.
                        RATED-CFM = 33976.  MAX-OA-FRACTION = 0.0
                        SUPPLY-DELTA-T = 2.7  SUPPLY-KW = 0.00088
                        MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
                        MAX-FAN-RATIO = 1.0  MIN-FAN-RATIO = 0.2
                        NIGHT-CYCLE-CTRL = STAY-OFF  NIGHT-VENT-DT = 0.0
                        MIN-CFM-RATIO = 1.0  COOLING-CAPACITY = 1052000.
                        COOL-SH-CAP = 865200.  HEATING-CAPACITY = -1014400.
                        RETURN-AIR-PATH = DUCT
                        ZONE-NAMES = (inter-zone, EXTER-N, EXTER-S,
                                      EXTER-E, EXTER-W) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

RPT_#1  =REPORT-BLOCK VARIABLE-TYPE = inter-zone
          VARIABLE-LIST = (17,18,7,6) ..
rpt_#2  =REPORT-BLOCK VARIABLE-TYPE = EXTER-N
          VARIABLE-LIST = (17,18,7,6) ..
AHU-RPT =REPORT-BLOCK VARIABLE-TYPE = MULTIZONE
          VARIABLE-LIST = (3,5,6,18,19) ..
INTERZN = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (RPT_#1)
..
EXT_N_ZN = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (rpt_#2)
..
AHU_REPORT = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (AHU-RPT)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #2 DDC CONTROL OF BLDG. 7618      *
        LINE-5 *ENL MEN BARRACKS W/O DIN      * ..

```

```

ABORT      ERRORS ..

```

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 13:46: 9 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL OF BLDG. 7618 ENL MEN BARRACKS W/O DIN  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MULTIZONE TOPEKA, KS

| MONTH | COOLING                     |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING                     |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) |        | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|--------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   |                                    |        |                                 |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -150.091                    | 4                       | 3                    | 8.F                  | 7.F                                     | 50190.                             | 98.953 |                                 |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -86.406                     | 1                       | 23                   | 17.F                 | 15.F                                    | 45333.                             | 98.953 |                                 |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -55.972                     | 3                       | 4                    | 16.F                 | 13.F                                    | 50190.                             | 98.953 |                                 |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -9.262                      | 4                       | 10                   | 34.F                 | 31.F                                    | 48571.                             | 98.953 |                                 |
| MAY   | 140.76512                   | 16                      | 2                    | 62.F                 | 1224.737                                | -2.987                      | 3                       | 22                   | 58.F                 | 56.F                                    | 50190.                             | 98.953 |                                 |
| JUN   | 317.55890                   | 19                      | 20                   | 84.F                 | 860.561                                 | 0.000                       |                         |                      | 0.000                | 0.000                                   | 48571.                             | 98.953 |                                 |
| JUL   | 378.86865                   | 1                       | 18                   | 87.F                 | 858.940                                 | 0.000                       |                         |                      | 0.000                | 0.000                                   | 50190.                             | 98.953 |                                 |
| AUG   | 374.46912                   | 24                      | 19                   | 92.F                 | 935.340                                 | 0.000                       |                         |                      | 0.000                | 0.000                                   | 50190.                             | 98.953 |                                 |
| SEP   | 234.02747                   | 5                       | 18                   | 90.F                 | 875.073                                 | 0.000                       |                         |                      | 0.000                | 0.000                                   | 48571.                             | 98.953 |                                 |
| OCT   | 5.33917                     | 1                       | 18                   | 83.F                 | 512.011                                 | -8.489                      | 31                      | 7                    | 43.F                 | 39.F                                    | 50190.                             | 98.953 |                                 |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -27.057                     | 2                       | 4                    | 17.F                 | 15.F                                    | 48571.                             | 98.953 |                                 |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -128.658                    | 8                       | 10                   | 24.F                 | 22.F                                    | 50190.                             | 98.953 |                                 |
| TOTAL | 1451.029                    |                         |                      |                      |   | -468.923                    |                         |                      |                      |   | 590934.                            |        |                                 |
| MAX   |                             |                         |                      |                      | 1224.737                                |                             |                         |                      |                      |   |                                    | 98.953 |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 13:46: 9 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL OF BLDG. 7618 ENL MEN BARRACKS W/O DIN  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MULTIZONE TOPEKA, KS

| MONTH  | COOLING         |                          |                                 |          | HEATING                    |                            |                     |                     | ELECTRIC                  |                                      |  |  |
|--------|-----------------|--------------------------|---------------------------------|----------|----------------------------|----------------------------|---------------------|---------------------|---------------------------|--------------------------------------|--|--|
|        | COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | COINCIDENT<br>COOL-HEAT<br>LOAD | FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0               | 695                      | 0                               | 49       | 744                        | 0                          | 744                 | 0                   | 0                         | 49                                   | -79.229  | 33.650   |
| FEB    | 0               | 630                      | 0                               | 42       | 672                        | 0                          | 672                 | 0                   | 0                         | 42                                   | -69.146  | 33.650   |
| MAR    | 0               | 543                      | 0                               | 201      | 744                        | 0                          | 744                 | 0                   | 0                         | 201                                  | -122.456   | 33.650   |
| APR    | 0               | 363                      | 0                               | 357      | 720                        | 0                          | 720                 | 0                   | 0                         | 357                                  | -23.510  | 33.650   |
| MAY    | 384             | 158                      | 0                               | 202      | 744                        | 384                        | 744                 | 0                   | 0                         | 202                                  | 0.000  | 33.650   |
| JUN    | 720             | 0                        | 0                               | 0        | 720                        | 720                        | 720                 | 0                   | 0                         | 0                                    | 0.000  | 98.953   |
| JUL    | 744             | 0                        | 0                               | 0        | 744                        | 744                        | 744                 | 0                   | 0                         | 0                                    | 0.000  | 98.953   |
| AUG    | 744             | 0                        | 0                               | 0        | 744                        | 744                        | 744                 | 0                   | 0                         | 0                                    | 0.000  | 98.953   |
| SEP    | 720             | 0                        | 0                               | 0        | 720                        | 720                        | 720                 | 0                   | 0                         | 0                                    | 0.000  | 98.953   |
| OCT    | 24              | 376                      | 0                               | 344      | 744                        | 24                         | 744                 | 0                   | 0                         | 344                                  | 0.000  | 98.953   |
| NOV    | 0               | 470                      | 0                               | 250      | 720                        | 0                          | 720                 | 0                   | 0                         | 250                                  | -169.767   | 33.650   |
| DEC    | 0               | 684                      | 0                               | 60       | 744                        | 0                          | 744                 | 0                   | 0                         | 60                                   | -194.766   | 33.650   |
| ANNUAL | 3336            | 3919                     | 0                               | 1505     | 5424                       | 3336                       | 8760                | 0                   | 0                         | 1505                                 |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 13:46: 9 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL OF BLDG. 7618 ENL MEN BARRACKS W/O DIN  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|-----|--|---|---|
| JAN | 182.084<br>359.088<br>28/ 8                      | 182.084<br>359.088<br>28/ 8                         | 224.874<br>1032.776<br>4/ 3                         |
| FEB | 163.367<br>359.088<br>27/18                      | 163.367<br>359.088<br>27/18                         | 140.373<br>828.039<br>1/23                          |
| MAR | 177.160<br>359.088<br>31/ 9                      | 177.160<br>359.088<br>31/ 9                         | 90.855<br>783.711<br>3/ 4                           |
| APR | 167.934<br>353.851<br>5/ 9                       | 167.934<br>353.851<br>5/ 9                          | 18.367<br>367.847<br>4/10                           |
| MAY | 225.990<br>643.814<br>30/18                      | 225.990<br>643.814<br>30/18                         | 6.293<br>149.029<br>3/22                            |
| JUN | 284.679<br>653.619<br>19/19                      | 284.679<br>653.619<br>19/19                         | 0.000<br>0.000<br>30/ 1                             |
| JUL | 309.142<br>679.873<br>23/19                      | 309.142<br>679.873<br>23/19                         | 0.000<br>0.000<br>31/ 1                             |
| AUG | 312.468<br>693.323<br>24/18                      | 312.468<br>693.323<br>24/18                         | 0.000<br>0.000<br>31/ 1                             |
| SEP | 260.260<br>670.206<br>5/18                       | 260.260<br>670.206<br>5/18                          | 0.000<br>0.000<br>30/ 1                             |
| OCT | 175.771<br>519.934<br>1/18                       | 175.771<br>519.934<br>1/18                          | 17.232<br>312.092<br>31/ 7                          |
| NOV | 169.783<br>359.088<br>3/ 9                       | 169.783<br>359.088<br>3/ 9                          | 47.927<br>467.427<br>2/ 4                           |
| DEC | 181.531<br>359.088<br>31/ 9                      | 181.531<br>359.088<br>31/ 9                         | 197.532<br>850.828<br>8/10                          |
|     | ONE YEAR<br>USE/PEAK                             | 2610.166<br>693.323                                 | 743.454<br>1032.776                                 |



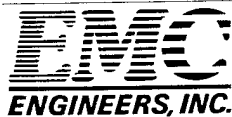
EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 13:46: 9 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL OF BLDG. 7618 ENL MEN BARRACKS W/O DIN  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE   | ELECTRICITY  | NATURAL-GAS                   |
|---|--------------|-------------------------------|
| IN SITE MBTU -  |              |                               |
| CATEGORY OF USE   |              |                               |
| SPACE HEAT  | 32.24        | 743.46                        |
| SPACE COOL  | 502.80       | 0.00                          |
| HVAC AUX  | 951.77       | 0.00                          |
| DOM HOT WTR   | 0.00         | 0.00                          |
| AUX SOLAR   | 0.00         | 0.00                          |
| LIGHTS  | 612.35       | 0.00                          |
| VERT TRANS  | 0.00         | 0.00                          |
| MISC EQUIP  | 511.10       | 0.00                          |
| TOTAL   | 2610.26      | 743.46                        |
| TOTAL SITE ENERGY   | 3353.62 MBTU | 80.1 KBTU/SQFT-YR GROSS-AREA  |
| TOTAL SOURCE ENERGY   | 8581.79 MBTU | 204.9 KBTU/SQFT-YR GROSS-AREA |
| PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE =  | 0.7          | 240.3 KBTU/SQFT-YR NET-AREA   |
| PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED   | = 0.0        | 614.8 KBTU/SQFT-YR NET-AREA   |
| NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY. |              |                               |

**COMPUTER ENERGY SIMULATIONS**

**BLDG. 409**

**BARRACKS BLOCK-TYPE BUILDINGS**



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

BUILDING NO.: 409  
BLDG. TYPE: ENL BARRACKS W/AS

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

### ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3    | RUN4 | RUN5    |
|----------------|---------|---------|---------|---------|------|---------|
| HEATING (MBtu) | 332.6   | 299.0   | 265.6   | 291.4   | 0.0  | 269.7   |
| COOLING (kWH)  | 149,754 | 149,640 | 144,770 | 144,122 | 0    | 147,615 |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 6,360 CFM                         |
| FLOOR AREA     | 5,304 FT²                         |
| CFM1           | 890 CFM                           |
| UA             | 1779 BTU/HR-°F                    |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

#### EZDOE COMPUTER RUN DEFINITION:

| BASERUN | EXISTING OPERATION          |
|---------|-----------------------------|
| RUN1    | NIGHT SETBACK               |
| RUN2    | DDC CONTROL                 |
| RUN3    | ECONOMIZER                  |
| RUN4    | NIGHTTIME INFILTRATION (OA) |
| RUN5    | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      |            | ANNUAL HEATING & COOLING HOURS |            |
|--------------------|-------------------|------|------------|--------------------------------|------------|
| M-F                | 0                 | 2400 | 120 HR     | HR. ON HEATING                 | 5448 HR/YR |
| SAT.               | 0                 | 2400 | 24 HR      | HR. ON COOLING                 | 3312 HR/YR |
| SUN.               | 0                 | 2400 | 24 HR      | HR. OFF HEATING                | 0 HR/YR    |
|                    | TOTAL OCCUPY HR.  |      | 168 HR/WK  | HR. OFF COOLING                | 0 HR/YR    |
|                    | TOTAL UNOCC. HR.  |      | 0 HR/WK    |                                |            |
|                    | ANNUAL OCCUPY HR. |      | 8760 HR/YR |                                |            |
|                    | ANNUAL UNOCC. HR. |      | 0 HR/YR    |                                |            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING

8760 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY

5448 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

3312 HR/YR

|                      |      |   |      |   |         |
|----------------------|------|---|------|---|---------|
| HRS SAVED (HTG ONLY) | 5448 | - | 5448 | = | 0 HR/YR |
| HRS SAVED (CLG ONLY) | 3312 | - | 3312 | = | 0 HR/YR |

|           |   |   |               |   |                     |
|-----------|---|---|---------------|---|---------------------|
| HOAUHC    | 332.58 MBtu   | - | 0 MBtu        | = | 0.00E+00 Btu/CFM-HR |
|           | 890.4 CFM   | x | 0 HR/YR       |   |                     |
| HOAUH     | 332.58 MBtu   | - | 0 MBtu        | = | 0.00E+00 Btu/CFM-HR |
|           | 890.4 CFM   | x | 0 HR/YR       |   |                     |
| COAUHC    | 149,753.9 kWH   | - | 0.0 kWH       | = | 0.00E+00 kWH/CFM-HR |
|           | 890.4 CFM   | x | 0 HR/YR       |   |                     |
| COAUC     | 149,753.9 kWH   | - | 0.0 kWH       | = | 0.00E+00 kWH/CFM-HR |
|           | 890.4 CFM   | x | 0 HR/YR       |   |                     |
| HOAOHC    | 332.58 MBtu   | - | 269.68 MBtu   | = | 8.06E+00 Btu/CFM-HR |
|           | 890.4 CFM   | x | 8760 HR/YR    |   |                     |
| HOAOH     | 332.58 MBtu   | - | 269.68 MBtu   | = | 1.30E+01 Btu/CFM-HR |
|           | 890.4 CFM   | x | 5448 HR/YR    |   |                     |
| COAOHC    | 149,753.9 kWH   | - | 147,615.0 kWH | = | 2.74E-04 kWH/CFM-HR |
|           | 890.4 CFM   | x | 8760 HR/YR    |   |                     |
| COAOC     | 149,753.9 kWH   | - | 147,615.0 kWH | = | 7.25E-04 kWH/CFM-HR |
|           | 890.4 CFM   | x | 3312 HR/YR    |   |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | = | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | = | 0.17                |
| ECC       | 149,753.9 kWH   | - | 144,122.5 kWH | = | 2.67E-04 kWH/CFM-HR |
|           | 6360 CFM  | x | 3312 HR/YR    |   |                     |
| ECHC      | 149,753.9 kWH   | - | 144,122.5 kWH | = | 1.01E-04 kWH/CFM-HR |
|           | 6360 CFM  | x | 8760 HR/YR    |   |                     |
| NSUCHC    | 149,753.9 kWH   | - | 149,639.6 kWH | = | 0.00E+00 kWH/CFM-HR |
|           | 6360 CFM  | x | 0 HR/YR       |   |                     |
| NSUCC     | 149,753.9 kWH   | - | 149,639.6 kWH | = | 0.00E+00 kWH/CFM-HR |
|           | 6360 CFM  | x | 0 HR/YR       |   |                     |
| DDCCHC    | 149,753.9 kWH   | - | 144,770.0 kWH | = | 8.95E-05 kWH/CFM-HR |
|           | 6360 CFM  | x | 8760 HR/YR    |   |                     |
| DDCCC     | 149,753.9 kWH   | - | 144,770.0 kWH | = | 2.37E-04 kWH/CFM-HR |
|           | 6360 CFM  | x | 3312 HR/YR    |   |                     |
| NSC       | 332.58 MBtu   | - | 298.99 MBtu   | = | 1.89E+04 Btu/UA     |
|           | 1778.644 UA   |   |               |   |                     |
| DDCH      | 332.58 MBtu   | - | 265.64 MBtu   | = | 3.76E+04 Btu/UA     |
|           | 1778.644 UA   |   |               |   |                     |
| OPT       | (2 HR/DAY X 240 DAY/YR)                               | - | 175 HR/YR     | = | 0 HR/YR             |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               | = | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01          | = | 5.67 HR/YR          |



INPUT LOADS ..

```

$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BLDG #409      *
        LINE-5 *ENL BARRACKS W/AS      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC WARNINGS ..
LOADS-REPORT VERIFICATION=(LV-D)
            SUMMARY=(LS-C,LS-D)
            HOURLY-DATA-SAVE = YES ..

BUILDING-LOCATION LATITUDE = 39.0
                LONGITUDE = 96.5
                ALTITUDE = 1065.
                TIME-ZONE = 6
                GROSS-AREA = 5304
                SHIELDING-COEF = 0.29
                X-REF = 0.0
                Y-REF = 0.0 ..

RUN-PERIOD  JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

```

LD_ON      =DAY-SCHEDULE (1,24) (1.) ..

LD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

LD_PEOPLEW =DAY-SCHEDULE (1,5) (1.)
                        (6,7) (0.75)
                        (8,10) (0.25)
                        (11,13) (0.5,0.75,0.5)
                        (14,16) (0.25)
                        (17,19) (0.75)
                        (20,24) (1.) ..

LD_PEOPLEE =DAY-SCHEDULE (1,8) (1.)
                        (9,23) (0.75)
                        (24) (1.) ..

LD_LIT/EQW =DAY-SCHEDULE (1,5) (0.1)
                        (6,7) (0.5,0.75)
                        (8,20) (1.)
                        (21,22) (0.75,0.5)
                        (23,24) (0.1) ..

```

```
LD_LIT/EQE =DAY-SCHEDULE (1,7) (0.1)
                        (8,9) (0.25,0.75)
                        (10,22) (1.)
                        (23,24) (0.75,0.5) ..
```

```
LD_PE_ENTW =DAY-SCHEDULE (1,5) (0.)
                        (6,7) (0.25)
                        (8,17) (0.1)
                        (18) (0.75)
                        (19,22) (1.)
                        (23,24) (0.5,0.1) ..
```

```
LD_PE_ENTE =DAY-SCHEDULE (1) (0.2)
                        (2,6) (0.)
                        (7,8) (0.2)
                        (9) (0.75)
                        (10,24) (1.) ..
```

```
LW_PEOPLE =WEEK-SCHEDULE (WD) LD_PEOPLEW
                        (WEH) LD_PEOPLEE ..
```

```
LW_LIT/EQP =WEEK-SCHEDULE (WD) LD_LIT/EQW
                        (WEH) LD_LIT/EQE ..
```

```
LW_PEO_ENT =WEEK-SCHEDULE (WD) LD_PE_ENTW
                        (WEH) LD_PE_ENTE ..
```

```
LW_ON =WEEK-SCHEDULE (ALL) LD_ON ..
```

```
LW_OFF =WEEK-SCHEDULE (ALL) LD_OFF ..
```

\$ ON 100% LOADS

```
L_ON =SCHEDULE THRU DEC 31 LW_ON ..
```

\$ OFF 100% LOADS

```
L_OFF =SCHEDULE THRU DEC 31 LW_OFF ..
```

\$ PEOPLE LOAD

```
L_PEOPLE =SCHEDULE THRU DEC 31 LW_PEOPLE ..
```

\$ LIGHTS AND EQUIPMENT

```
L_EQUI/LIG =SCHEDULE THRU DEC 31 LW_LIT/EQP ..
```

\$ POOL/TV\_ROOM ENTERAINMT

```
L_PEO_ENT =SCHEDULE THRU DEC 31 LW_PEO_ENT ..
```

\$ CONSTRUCTION TYPES

## \$ SAND-BLOCK, AIRSPACE, GYP

EXWALL-1 =LAYERS MATERIAL=(CB17,CB07,AL11,GP02)  
 THICKNESS=(1.000,0.500,0.000,0.052) ..  
 EXWALL =CONSTRUCTION LAYERS = EXWALL-1  
 ABSORPTANCE = 0.820  
 ROUGHNESS = 2 ..

## \$ SLAB FLOOR

FLOOR =CONSTRUCTION U-VALUE = 0.020  
 ABSORPTANCE = 0.610  
 ROUGHNESS = 5 ..

## \$ SHINGLE COVERED ROOF

ROOFSHNG =LAYERS MATERIAL=(AR02,HF-E3,PW05,AL33,IN03,GP03)  
 THICKNESS=(0.000,0.031,0.063,0.000,0.511,0.063) ..  
 SHNGROOF =CONSTRUCTION LAYERS = ROOFSHNG  
 ABSORPTANCE = 0.910 ..

## \$ STANDARD WOOD DOOR

DOOR-STD =LAYERS MATERIAL=(WD01,IN31,WD01) I-F-R= 0.6100  
 THICKNESS=(0.063,0.042,0.063) ..  
 DOOR-WOD =CONSTRUCTION LAYERS = DOOR-STD  
 ABSORPTANCE = 0.860  
 ROUGHNESS = 5 ..

SP\_W/\_ST =GLASS-TYPE GLASS-TYPE-CODE = 2  
 PANES = 2 ..

## \$ SPACE DESCRIPTION

SW\_ROOMS =SPACE AREA = 1140.0 VOLUME = 29640.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 16.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.27  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_EQUI/LIG  
 EQUIP-SCHEDULE = L\_EQUI/LIG EQUIPMENT-KW = 1.46  
 FURN-WEIGHT = 0.8 INF-METHOD = NONE ..

E-W HEIGHT = 26.0 WIDTH = 76.0 CONS = EXWALL  
 AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 8.0 WIDTH = 3.5 G-T = SP\_W/\_ST  
 MULTIPLIER = 13.0 SETBACK = 1.0  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 23.5  
 OVERHANG-D = 9. ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = SHNGROOF  
 MULTIPLIER = 2.0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 26.0 WIDTH = 15.0 CONS = EXWALL  
 AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 8.0 WIDTH = 3.5 G-T = SP\_W/\_ST  
 MULTIPLIER = 2.0 SETBACK = 1.0  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 23.5  
 OVERHANG-D = 9. ..

ROOF HEIGHT = 15.0 WIDTH = 76.0 CONS = SHNGROOF  
 TILT = 0 SKY-FORM-FACTOR = 0.75  
 GND-FORM-FACTOR = 0.25 ..

NE\_ROOMS =SPACE AREA = 1140.0 VOLUME = 29640.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 16.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.27  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_EQUI/LIG  
 EQUIP-SCHEDULE = L\_EQUI/LIG EQUIPMENT-KW = 1.46  
 FURN-WEIGHT = 0.8 INF-METHOD = NONE ..

E-W HEIGHT = 26.0 WIDTH = 76.0 CONS = EXWALL  
 AZIMUTH = 45 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 8.0 WIDTH = 3.5 G-T = SP\_W/\_ST  
 MULTIPLIER = 13.0 SETBACK = 1.0  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 23.5  
 OVERHANG-D = 9. ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = SHNGROOF  
 MULTIPLIER = 2.0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 26.0 WIDTH = 15.0 CONS = EXWALL  
 AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 8.0 WIDTH = 3.5 G-T = SP\_W/\_ST  
 MULTIPLIER = 2.0 SETBACK = 1.0  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 23.5  
 OVERHANG-D = 9. ..

ROOF HEIGHT = 15.0 WIDTH = 76.0 CONS = SHNGROOF  
 TILT = 0 SKY-FORM-FACTOR = 0.75  
 GND-FORM-FACTOR = 0.25 ..

TV/POOL\_RM =SPACE AREA = 2200.0 VOLUME = 28600.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEO\_ENT NUMBER-OF-PEOPLE = 10.0



PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-KW = 2.05  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_EQUI/LIG  
 EQUIP-SCHEDULE = L\_EQUI/LIG EQUIPMENT-KW = 0.3  
 FURN-WEIGHT = 0.8 INF-METHOD = NONE ..

E-W HEIGHT = 5.0 WIDTH = 40.0 CONS = EXWALL  
 AZIMUTH = 45 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 3.0 WIDTH = 4.0 G-T = SP\_W/\_ST  
 MULTIPLIER = 3.0 SETBACK = 1.0  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 23.5  
 OVERHANG-D = 9. ..

E-W HEIGHT = 5.0 WIDTH = 55.0 CONS = EXWALL  
 AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 3.0 WIDTH = 4.0 G-T = SP\_W/\_ST  
 MULTIPLIER = 6.0 SETBACK = 1.0  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 23.5  
 OVERHANG-D = 9. ..

E-W HEIGHT = 5.0 WIDTH = 55.0 CONS = EXWALL  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 3.0 WIDTH = 4.0 G-T = SP\_W/\_ST  
 MULTIPLIER = 6.0 SETBACK = 1.0  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 23.5  
 OVERHANG-D = 9. ..

U-W HEIGHT = 8.0 WIDTH = 170.0 CONS = FLOOR ..

U-W HEIGHT = 40.0 WIDTH = 55.0 CONS = FLOOR ..

BASE\_HALL =SPACE AREA = 824.0 VOLUME = 10712.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEO\_ENT NUMBER-OF-PEOPLE = 3.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-KW = 0.6  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_EQUI/LIG  
 EQUIP-SCHEDULE = L\_EQUI/LIG FURN-WEIGHT = 0.8  
 INF-METHOD = NONE ..

E-W HEIGHT = 4.0 WIDTH = 23.0 CONS = EXWALL  
 AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 3.0 WIDTH = 3.5 G-T = SP\_W/\_ST  
 MULTIPLIER = 2.0 SETBACK = 1.0

SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 23.5  
 OVERHANG-D = 9. ..

E-W HEIGHT = 4.0 WIDTH = 17.0 CONS = EXWALL  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 4.0 WIDTH = 10.0 CONS = EXWALL  
 AZIMUTH = 45 INSIDE-VIS-REFL = 0.2 ..

WINDOW HEIGHT = 3.0 WIDTH = 3.5 G-T = SP\_W/\_ST  
 SETBACK = 1.0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 OVERHANG-A = 10.  
 OVERHANG-W = 23.5 OVERHANG-D = 9. ..

U-W HEIGHT = 9.0 WIDTH = 23.0 CONS = FLOOR  
 AZIMUTH = 225 ..

U-W HEIGHT = 9.0 WIDTH = 17.0 CONS = FLOOR  
 AZIMUTH = 135 ..

U-W HEIGHT = 9.0 WIDTH = 10.0 CONS = FLOOR  
 AZIMUTH = 45 ..

U-W HEIGHT = 16.0 WIDTH = 51.5 CONS = FLOOR ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*BASELINE SIMULATION FOR BLDG #409 \*  
 LINE-5 \*ENL BARRACKS W/AS \* ..  
 ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

```

SD_WT_HT   =DAY-SCHEDULE (1,24) (74.) ..
SD_SM_CL   =DAY-SCHEDULE (1,24) (72.) ..
SD_WT_CL   =DAY-SCHEDULE (1,16) (74.2)
              (17) (74.27)
              (18,24) (74.2) ..
SD_SM_HT   =DAY-SCHEDULE (1,24) (71.8) ..
SD_OA_FRAC =DAY-SCHEDULE (1,24) (0.14) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..

SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT   =WEEK-SCHEDULE (ALL) SD_WT_HT ..

SW_SM_CL   =WEEK-SCHEDULE (ALL) SD_SM_CL ..

SW_WT_CL   =WEEK-SCHEDULE (ALL) SD_WT_CL ..

SW_SM_HT   =WEEK-SCHEDULE (ALL) SD_SM_HT ..

SW_OA_FRAC =WEEK-SCHEDULE (ALL) SD_OA_FRAC ..

```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..
```

## \$ HEATING SEASON

```

S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT 1 SW_OFF
              THRU DEC 31 SW_ON ..

```

## \$ COOLING SEASON

```

S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT 1 SW_ON
              THRU DEC 31 SW_OFF ..

```

## \$ HEATING SET TEMP

```

S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
              THRU OCT 1 SW_SM_HT
              THRU DEC 31 SW_WT_HT ..

```

## \$ COOLING SET TEMP

```

S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
              THRU OCT 1 SW_SM_CL
              THRU DEC 31 SW_WT_CL ..

```

## S\_HRLY-RPT =SCHEDULE THRU JAN 20 SW\_OFF

```

              THRU JAN 21 SW_ON
              THRU AUG 14 SW_OFF
              THRU AUG 15 SW_ON
              THRU DEC 31 SW_OFF ..

```

```
S_OA_FRACT =SCHEDULE THRU DEC 31 SW_OA_FRAC ..
```

## \$ ZONE DESCRIPTION

SW\_ROOMS =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

NE\_ROOMS =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

TV/POOL\_RM =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

BASE\_HALL =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ-ZN\_1&2 =SYSTEM SYSTEM-TYPE = MZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 OA-CONTROL = FIXED SUPPLY-CFM = 6115.  
 RATED-CFM = 6115. MIN-OUTSIDE-AIR = 0.14  
 MIN-AIR-SCH = S\_OA\_FRACT MAX-OA-FRACTION = 0.14  
 SUPPLY-DELTA-T = 2.7 SUPPLY-KW = 0.00088  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 151000.  
 COOL-SH-CAP = 127000. HEATING-CAPACITY = -174600.  
 RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (SW\_ROOMS, NE\_ROOMS) ..

MZ-ZN\_3&4 =SYSTEM SYSTEM-TYPE = MZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 OA-CONTROL = FIXED SUPPLY-CFM = 1950.  
 RATED-CFM = 1950. MIN-OUTSIDE-AIR = 0.14  
 MIN-AIR-SCH = S\_OA\_FRACT MAX-OA-FRACTION = 0.14  
 SUPPLY-DELTA-T = 2.7 SUPPLY-KW = 0.00088  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW

NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 50400.  
 COOL-SH-CAP = 40700. HEATING-CAPACITY = -42200.  
 RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (TV/POOL\_RM, BASE\_HALL) ..

## \$ HOURLY REPORT DESCRIPTION

ZONE1-BLK =REPORT-BLOCK VARIABLE-TYPE = SW\_ROOMS  
                                   VARIABLE-LIST = (17,18,7,6) ..  
 ZONE3-BLK =REPORT-BLOCK VARIABLE-TYPE = TV/POOL\_RM  
                                   VARIABLE-LIST = (17,18,7,6) ..  
 AHU-1-BLK =REPORT-BLOCK VARIABLE-TYPE = MZ-ZN\_1&2  
                                   VARIABLE-LIST = (3,5,6,18,19,17) ..  
 AHU-2-BLK =REPORT-BLOCK VARIABLE-TYPE = MZ-ZN\_3&4  
                                   VARIABLE-LIST = (3,5,6,18,19,17) ..  
 HRLY-ZN-1 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                                   REPORT-BLOCK = (ZONE1-BLK)  
 ..  
 HRLY-ZN-3 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                                   REPORT-BLOCK = (ZONE3-BLK)  
 ..  
 HRLY-AHU-1 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                                   REPORT-BLOCK = (AHU-1-BLK)  
 ..  
 HRLY-AHU-2 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                                   REPORT-BLOCK = (AHU-2-BLK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*BASELINE SIMULATION FOR BLDG #409 \*  
 LINE-5 \*ENL BARRACKS W/AS \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
                   SUMMARY=(PS-B,BEPS)  
                   HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..

PD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

PW\_OFF =WEEK-SCHEDULE (ALL) PD\_OFF ..

PW\_ON =WEEK-SCHEDULE (ALL) PD\_ON ..

\$ HEATING SEASON

P\_HEAT =SCHEDULE THRU MAY 15 PW\_ON  
THRU OCT 1 PW\_OFF  
THRU DEC 31 PW\_ON ..

\$ COOLING SEASON

P\_COOL =SCHEDULE THRU MAY 15 PW\_OFF  
THRU OCT 1 PW\_ON  
THRU DEC 31 PW\_OFF ..

\$ EQUIPMENT DESCRIPTION

BOILSTM =PLANT-EQUIPMENT TYPE = STM-BOILER  
SIZE = -999. ..

REC-CHILLR =PLANT-EQUIPMENT TYPE = HERM-REC-CHLR  
SIZE = -999. INSTALLED-NUMBER = 2  
MAX-NUMBER-AVAIL = 2 ..

PLANT-PARAMETERS BOILER-FUEL = NATURAL-GAS HERM-REC-COND-TYPE = AIR  
CCIRC-HEAD = 0.0 HCIRC-HEAD = 0.0 ..

ENERGY-RESOURCE RESOURCE = ELECTRICITY ..

ENERGY-RESOURCE RESOURCE = NATURAL-GAS ..

HEAT-SEASO =LOAD-ASSIGNMENT TYPE = HEATING  
OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = BOILSTM  
NUMBER = 1 ..

COOL-SEASO =LOAD-ASSIGNMENT TYPE = COOLING  
OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = REC-CHILLR  
NUMBER = 2 ..

END ..

COMPUTE PLANT ..

Path: C:\ELITE\EZDOE

File: MOD409 .INP 21,492 .a.. 6-12-95 12:33:08

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STOP ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 12:33:17 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

NUMBER OF EXTERIOR SURFACES 12 RECTANGULAR 12 OTHER 0  
 (U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED )

| SURFACE    | SPACE | - - - G L A S S - - -<br>U-VALUE<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) | - - - W A L L - - -<br>U-VALUE<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) | - - - W A L L + G L A S S - - -<br>U-VALUE<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) | AZIMUTH    |
|------------|-------|---|----------------|---|----------------|---|----------------|------------|
| NE ROOMS   |       | 0.490   | 364.00         | 0.231   | 1612.00        | 0.278   | 1976.00        | NORTH-EAST |
| TV/POOL RM |       | 0.490   | 36.00          | 0.231   | 164.00         | 0.277   | 200.00         | NORTH-EAST |
| BASE HALL  |       | 0.490   | 10.50          | 0.231   | 29.50          | 0.299   | 40.00          | NORTH-EAST |
| BASE_HALL  |       | 0.000   | 0.00           | 0.231   | 68.00          | 0.231   | 68.00          | SOUTH-EAST |
| TV/POOL RM |       | 0.490   | 72.00          | 0.231   | 203.00         | 0.299   | 275.00         | SOUTH-EAST |
| SW ROOMS   |       | 0.490   | 364.00         | 0.231   | 1612.00        | 0.278   | 1976.00        | SOUTH-WEST |
| BASE HALL  |       | 0.490   | 21.00          | 0.231   | 71.00          | 0.290   | 92.00          | SOUTH-WEST |
| SW ROOMS   |       | 0.490   | 56.00          | 0.231   | 334.00         | 0.268   | 390.00         | NORTH-WEST |
| TV/POOL RM |       | 0.490   | 72.00          | 0.231   | 203.00         | 0.299   | 275.00         | NORTH-WEST |
| NE ROOMS   |       | 0.490   | 56.00          | 0.231   | 334.00         | 0.268   | 390.00         | NORTH-WEST |
| SW ROOMS   |       | 0.000   | 0.00           | 0.041   | 1140.00        | 0.041   | 1140.00        | ROOF       |
| NE ROOMS   |       | 0.000   | 0.00           | 0.041   | 1140.00        | 0.041   | 1140.00        | ROOF       |
| TV/POOL RM |       | 0.000   | 0.00           | 0.020   | 1360.00        | 0.020   | 1360.00        | UNDERGRND  |
| TV/POOL_RM |       | 0.000   | 0.00           | 0.020   | 2200.00        | 0.020   | 2200.00        | UNDERGRND  |
| BASE_HALL  |       | 0.000   | 0.00           | 0.020   | 207.00         | 0.020   | 207.00         | UNDERGRND  |
| BASE_HALL  |       | 0.000   | 0.00           | 0.020   | 153.00         | 0.020   | 153.00         | UNDERGRND  |
| BASE_HALL  |       | 0.000   | 0.00           | 0.020   | 90.00          | 0.020   | 90.00          | UNDERGRND  |
| BASE_HALL  |       | 0.000   | 0.00           | 0.020   | 824.00         | 0.020   | 824.00         | UNDERGRND  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 12:33:17 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

|             | AVERAGE<br>U-VALUE/GLASS<br>(BTU/HR-SQFT-F) | AVERAGE<br>U-VALUE/WALLS<br>(BTU/HR-SQFT-F) | AVERAGE U-VALUE<br>WALLS+GLASS<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | OPAQUE<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) |
|-------------|---|---|---|-------------------------|--------------------------|--------------------------------|
| NORTH-EAST  | 0.490                                       | 0.231                                       | 0.279   | 410.50                  | 1805.50                  | 2216.00                        |
| SOUTH-EAST  | 0.490                                       | 0.231                                       | 0.285   | 72.00                   | 271.00                   | 343.00                         |
| SOUTH-WEST  | 0.490                                       | 0.231                                       | 0.279   | 385.00                  | 1683.00                  | 2068.00                        |
| NORTH-WEST  | 0.490                                       | 0.231                                       | 0.276   | 184.00                  | 871.00                   | 1055.00                        |
| ROOF        | 0.000                                       | 0.041                                       | 0.041   | 0.00                    | 2280.00                  | 2280.00                        |
| ALL WALLS   | 0.490                                       | 0.231                                       | 0.279   | 1051.50                 | 4630.50                  | 5682.00                        |
| WALLS+ROOFS | 0.490                                       | 0.168                                       | 0.210   | 1051.50                 | 6910.50                  | 7962.00                        |
| UNDERGRND   | 0.000                                       | 0.020                                       | 0.020   | 0.00                    | 4834.00                  | 4834.00                        |
| BUILDING    | 0.490                                       | 0.107                                       | 0.139   | 1051.50                 | 11744.50                 | 12796.00                       |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOB-2.1D 6/12/1995 12:33:17 LDL RUN 1  
DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #409 ENL BARRACKS W/AS  
REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS

\*\*\* BUILDING \*\*\*

FLOOR AREA 5304 SQFT 493 SQMT  
VOLUME 98592 CUFT 2792 CUMT

COOLING LOAD  
JUL 23 5PM  
97F 36C  
79F 26C

HEATING LOAD  
JAN 28 5AM  
-1F -18C  
-2F -19C

|                      | SENSIBLE<br>(KBTU/H) ( KW ) |                | LATENT<br>(KBTU/H) ( KW ) |       | SENSIBLE<br>(KBTU/H) ( KW ) |                |
|----------------------|-----------------------------|----------------|---------------------------|-------|-----------------------------|----------------|
| WALLS                | 12.782                      | 3.743          | 0.000                     | 0.000 | -66.921                     | -19.600        |
| ROOFS                | 5.103                       | 1.494          | 0.000                     | 0.000 | -6.980                      | -2.044         |
| GLASS CONDUCTION     | 11.154                      | 3.267          | 0.000                     | 0.000 | -39.924                     | -11.693        |
| GLASS SOLAR          | 26.039                      | 7.626          | 0.000                     | 0.000 | 1.066                       | 0.312          |
| DOOR                 | 0.107                       | 0.031          | 0.000                     | 0.000 | -0.325                      | -0.095         |
| INTERNAL SURFACES    | 0.000                       | 0.000          | 0.000                     | 0.000 | 0.000                       | 0.000          |
| UNDERGROUND SURFACES | -0.868                      | -0.254         | 0.000                     | 0.000 | -2.776                      | -0.813         |
| OCCUPANTS TO SPACE   | 13.681                      | 4.007          | 23.125                    | 6.773 | 11.980                      | 3.509          |
| LIGHT TO SPACE       | 16.782                      | 4.915          | 0.000                     | 0.000 | 4.737                       | 1.387          |
| EQUIPMENT TO SPACE   | 10.145                      | 2.971          | 0.000                     | 0.000 | 2.220                       | 0.650          |
| PROCESS TO SPACE     | 0.000                       | 0.000          | 0.000                     | 0.000 | 0.000                       | 0.000          |
| INFILTRATION         | 0.000                       | 0.000          | 0.000                     | 0.000 | 0.000                       | 0.000          |
| TOTAL                | 94.924                      | 27.801         | 23.125                    | 6.773 | -96.924                     | -28.387        |
| TOTAL LOAD           | 118.049 KBTU/H              | 34.573 KW      |                           |       | -96.924 KBTU/H              | -28.387 KW     |
| TOTAL LOAD / AREA    | 22.26BTU/H.SQFT             | 70.163 W /SQMT |                           |       | 18.274BTU/H.SQFT            | 57.608 W /SQMT |

\*\*\*\*\*  
\* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR \*  
\* LOADS \*  
\* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION \*  
\* IN CONSIDERATION \*  
\*\*\*\*\*



EMC ENGINEERS INC. DOE-2.1D 6/12/1995 12:33:17 SDL RUN 1  
 DENVER, CO 80227 EZDOE - ELITE SOFTWARE DEVELOPMENT INC ENL BARRACKS W/AS  
 REPORT- SV-A SYSTEM DESIGN PARAMETERS MZ-ZN\_3&4 BASELINE SIMULATION FOR BLDG #409 TOPEKA, KS

SYSTEM NAME ALTITUDE  
 MZ-ZN\_3&4 1.040  
 SUPPLY FAN ELEC DELTA-T RETURN FAN DELTA-T  
 (CFM) (KW) (F) (CFM) (F)  
 2028. 1.716 2.6 0. 0.000 0.0  
 ELEC (KW) 0.000  
 FAN (KW) 0.000  
 EXHAUST FLOW 0.0  
 SUPPLY FLOW 1629.0  
 399.0  
 ZONE NAME  
 TV/POOL\_RM  
 BASE\_HALL  
 OUTSIDE AIR RATIO 0.088 COOLING CAPACITY (KBTU/HR) 50.400 HEATING CAPACITY (KBTU/HR) -42.200 COOLING EIR (BTU/HR) 0.00 HEATING EIR (BTU/HR) 0.00  
 MINIMUM FLOW RATIO 1.000 1.000 1.000  
 FAN (KW) 0.000 0.000 0.000  
 EXHAUST FLOW 0.0 0.0  
 SUPPLY FLOW 1629.0 399.0  
 EXTRACTION SENSIBLE (SHR) 0.00 0.00 0.00  
 RATE (KBTU/HR) 21.59 5.29  
 HEATING CAPACITY (KBTU/HR) 0.00 0.00  
 HEATING ADDITION RATE (KBTU/HR) -25.97 -6.36  
 MULTIPLIER 1.0 1.0

EMC ENGINEERS INC. DOE-2.1D 6/12/1995 12:33:17 SDL RUN 1  
 DENVER, CO 80227 EZDOE - ELITE SOFTWARE DEVELOPMENT INC ENL BARRACKS W/AS  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-ZN\_1&2 TOPEKA, KS

| MONTH | COOLING               |                   |               |               | HEATING               |                   |               |               | ELEC                           |                                |                          |                        |
|-------|-----------------------|-------------------|---------------|---------------|-----------------------|-------------------|---------------|---------------|--------------------------------|--------------------------------|--------------------------|------------------------|
|       | COOLING ENERGY (MBTU) | TIME OF MAX DY HR | DRY-BULB TEMP | WET-BULB TEMP | HEATING ENERGY (MBTU) | TIME OF MAX DY HR | DRY-BULB TEMP | WET-BULB TEMP | MAXIMUM COOLING LOAD (KBTU/HR) | MAXIMUM HEATING LOAD (KBTU/HR) | ELEC TRICAL ENERGY (KWH) | MAXIMUM ELEC LOAD (KW) |
| JAN   | 0.00000               |                   |               |               | -49.586               | 15                | 7             | -7.F          | -8.F                           | -139.382                       | 6908.                    | 11.194                 |
| FEB   | 0.00000               |                   |               |               | -33.954               | 3                 | 5             | -1.F          | -2.F                           | -118.579                       | 6240.                    | 11.194                 |
| MAR   | 0.00000               |                   |               |               | -21.519               | 4                 | 5             | 14.F          | 12.F                           | -91.308                        | 6911.                    | 11.194                 |
| APR   | 0.00000               |                   |               |               | -3.379                | 1                 | 1             | 32.F          | 29.F                           | -52.056                        | 6687.                    | 11.194                 |
| MAY   | 24.36190              | 31                | 18            | 90.F          | -0.359                | 10                | 23            | 60.F          | 56.F                           | -4.717                         | 6908.                    | 11.194                 |
| JUN   | 58.90283              | 27                | 17            | 89.F          | 0.000                 |                   |               |               |                                | 0.000                          | 6688.                    | 11.194                 |
| JUL   | 73.04342              | 17                | 18            | 88.F          | 0.000                 |                   |               |               |                                | 0.000                          | 6907.                    | 11.194                 |
| AUG   | 69.46891              | 22                | 17            | 95.F          | 0.000                 |                   |               |               |                                | 0.000                          | 6911.                    | 11.194                 |
| SEP   | 38.63323              | 5                 | 18            | 90.F          | 0.000                 |                   |               |               |                                | 0.000                          | 6687.                    | 11.194                 |
| OCT   | 0.70455               | 1                 | 18            | 83.F          | -2.985                | 20                | 8             | 23.F          | 22.F                           | -57.293                        | 6907.                    | 11.194                 |
| NOV   | 0.00000               |                   |               |               | -18.309               | 3                 | 5             | 13.F          | 12.F                           | -87.805                        | 6685.                    | 11.194                 |
| DEC   | 0.00000               |                   |               |               | -43.211               | 15                | 2             | 3.F           | 2.F                            | -120.453                       | 6908.                    | 11.194                 |
| TOTAL | 265.115               |                   |               |               | -173.299              |                   |               |               |                                | -139.382                       | 81351.                   | 11.194                 |
| MAX   |                       |                   |               |               |                       |                   |               |               |                                |                                |                          |                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 12:33:17 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-ZN 1&2 TOPEKA, KS

---COINCIDENT LOADS---

| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE | HOURS<br>FANS<br>ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
|--------|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|---------------------------|---------------------|---------------------------|--------------------------------------|---|--|
| JAN    | 0                        | 744                      | 0  | 0                 | 744                        | 0                          | 744                       | 0                   | 0                         | 0                                    | -57.761                                       | 5.963  |
| FEB    | 0                        | 672                      | 0  | 0                 | 672                        | 0                          | 672                       | 0                   | 0                         | 0                                    | -54.478                                       | 5.963  |
| MAR    | 0                        | 744                      | 0  | 0                 | 744                        | 0                          | 744                       | 0                   | 0                         | 0                                    | -51.100                                       | 5.963  |
| APR    | 0                        | 720                      | 0  | 0                 | 720                        | 0                          | 720                       | 0                   | 0                         | 0                                    | -4.653  | 5.963  |
| MAY    | 380                      | 360                      | 0  | 4                 | 360                        | 384                        | 744                       | 0                   | 0                         | 4                                    | 0.000   | 11.194   |
| JUN    | 714                      | 0                        | 0  | 6                 | 0                          | 720                        | 720                       | 0                   | 0                         | 6                                    | 0.000   | 11.194   |
| JUL    | 744                      | 0                        | 0  | 0                 | 0                          | 744                        | 744                       | 0                   | 0                         | 0                                    | 0.000   | 11.194   |
| AUG    | 744                      | 0                        | 0  | 0                 | 0                          | 744                        | 744                       | 0                   | 0                         | 0                                    | 0.000   | 11.194   |
| SEP    | 611                      | 0                        | 0  | 109               | 0                          | 720                        | 744                       | 0                   | 0                         | 109                                  | 0.000   | 11.194   |
| OCT    | 15                       | 720                      | 0  | 9                 | 720                        | 24                         | 744                       | 0                   | 0                         | 9                                    | 0.000   | 11.194   |
| NOV    | 0                        | 720                      | 0  | 0                 | 720                        | 0                          | 720                       | 0                   | 0                         | 0                                    | -63.991                                       | 5.963  |
| DEC    | 0                        | 744                      | 0  | 0                 | 744                        | 0                          | 744                       | 0                   | 0                         | 0                                    | -68.513                                       | 8.288  |
| ANNUAL | 3208                     | 5424                     | 0  | 128               | 5424                       | 3336                       | 8760                      | 0                   | 0                         | 128                                  |   |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 12:33:17 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- SS-K SPACE TEMPERATURE SUMMARY MZ-ZN 1&2 TOPEKA, KS

| MONTH  | ALL<br>HOURS<br>(F) | COOLING<br>HOURS<br>(F) | HEATING<br>HOURS<br>(F) | FAN ON<br>HOURS<br>(F) | FAN OFF<br>HOURS<br>(F) | AVERAGE TEMPERATURE<br>BETWEEN<br>OUTDOOR&<br>ROOM AIR<br>ALL<br>HOURS<br>(F) | DIFFERENCE<br>BETWEEN<br>OUTDOOR&<br>ROOM AIR<br>FAN OFF<br>HOURS<br>(F) | SUMMED TEMP DIFFERENCE<br>BETWEEN<br>OUTDOOR&<br>ROOM AIR<br>HEATING<br>HOURS<br>(F) | HUMIDITY RATIO<br>DIFFERENCE<br>OUTDOOR AND<br>ROOM AIR<br>(FRAC. OR MULT. ) |
|--------|---------------------|-------------------------|-------------------------|------------------------|-------------------------|---|--|--|--|
| JAN    | 74.04               | 74.04                   | 74.04                   | 74.04                  | 0.00                    | -48.23  | 0.00   | 1495.16  | -0.00363   |
| FEB    | 74.08               | 74.08                   | 74.08                   | 74.08                  | 0.00                    | -42.40  | 0.00   | 1187.14  | -0.00365   |
| MAR    | 74.54               | 74.54                   | 74.54                   | 74.54                  | 0.00                    | -34.26  | 0.00   | 1062.15  | -0.00362   |
| APR    | 81.12               | 81.12                   | 81.12                   | 81.12                  | 0.00                    | -24.35  | 0.00   | 730.36   | -0.00373   |
| MAY    | 78.87               | 71.84                   | 86.36                   | 78.87                  | 0.00                    | -12.78  | 0.00   | 478.73   | -0.00244   |
| JUN    | 71.84               | 71.84                   |                         | 71.84                  | 0.00                    | 1.81  | 0.00   | 213.21   | 0.00126  |
| JUL    | 71.86               | 71.86                   |                         | 71.86                  | 0.00                    | 5.32  | 0.00   | 215.06   | 0.00309  |
| AUG    | 71.85               | 71.85                   |                         | 71.85                  | 0.00                    | 7.27  | 0.00   | 293.05   | 0.00178  |
| SEP    | 71.75               | 71.82                   |                         | 71.75                  | 0.00                    | -4.20   | 0.00   | 303.31   | -0.00085   |
| OCT    | 79.92               | 71.79                   | 80.23                   | 79.92                  | 0.00                    | -22.03  | 0.00   | 676.92   | -0.00372   |
| NOV    | 75.17               |                         | 75.17                   | 75.17                  | 0.00                    | -31.06  | 0.00   | 931.81   | -0.00368   |
| DEC    | 74.06               |                         | 74.06                   | 74.06                  | 0.00                    | -44.02  | 0.00   | 1364.50  | -0.00362   |
| ANNUAL | 74.93               | 71.84                   | 76.85                   | 74.93                  | 0.00                    | -20.63  | 0.00   | 7802.66  | -0.00189   |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 12:33:17 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- SS-O TEMPERATURE SCATTER PLOT MZ-ZN 1&2 FOR SW ROOMS TOPEKA, KS

| HOUR     | TOTAL HOURS AT TEMPERATURE LEVEL AND TIME OF DAY |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     | TOTAL |
|----------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
|          | 1AM  | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 1PM | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  |       |
| ABOVE 85 | 14   | 13  | 11  | 11  | 11  | 11  | 9   | 11  | 13  | 18  | 22  | 27  | 30  | 30  | 35  | 40  | 43  | 41  | 37  | 34  | 31  | 25  | 21  | 20  | 558   |
| 81-85    | 23   | 19  | 18  | 16  | 13  | 12  | 16  | 16  | 19  | 21  | 23  | 25  | 27  | 32  | 29  | 28  | 24  | 27  | 27  | 25  | 22  | 24  | 24  | 23  | 533   |
| 76-80    | 26   | 28  | 26  | 26  | 24  | 24  | 27  | 28  | 30  | 29  | 32  | 29  | 26  | 36  | 42  | 39  | 32  | 29  | 29  | 30  | 30  | 28  | 24  | 700 |       |
| 71-75    | 301  | 304 | 309 | 311 | 314 | 316 | 315 | 310 | 305 | 296 | 291 | 281 | 279 | 277 | 265 | 255 | 259 | 265 | 272 | 277 | 282 | 286 | 292 | 298 | 6960  |
| 66-70    | 1  | 1   | 1   | 1   | 1   | 2   | 1   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 9   |       |
| 61-65    | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |       |
| BELOW 60 | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |       |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 12:33:17 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- SS-O TEMPERATURE SCATTER PLOT MZ-ZN 1&2 FOR NE ROOMS TOPEKA, KS

| HOUR     | TOTAL HOURS AT TEMPERATURE LEVEL AND TIME OF DAY |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     | TOTAL |
|----------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
|          | 1AM  | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 1PM | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  |       |
| ABOVE 85 | 13   | 11  | 11  | 11  | 11  | 10  | 9   | 11  | 13  | 16  | 22  | 25  | 29  | 29  | 32  | 36  | 37  | 38  | 36  | 33  | 28  | 24  | 20  | 16  | 521   |
| 81-85    | 20   | 18  | 16  | 15  | 13  | 13  | 16  | 16  | 18  | 19  | 21  | 27  | 24  | 30  | 31  | 29  | 28  | 25  | 22  | 23  | 25  | 20  | 22  | 23  | 514   |
| 76-80    | 27   | 29  | 28  | 23  | 23  | 22  | 23  | 26  | 27  | 31  | 29  | 28  | 33  | 29  | 29  | 30  | 30  | 30  | 32  | 31  | 28  | 32  | 27  | 26  | 673   |
| 71-75    | 304  | 306 | 309 | 315 | 317 | 318 | 316 | 311 | 307 | 299 | 293 | 285 | 279 | 277 | 273 | 270 | 270 | 272 | 275 | 278 | 284 | 289 | 296 | 299 | 7042  |
| 66-70    | 1  | 1   | 1   | 1   | 1   | 2   | 1   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 1   | 10    |
| 61-65    | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| BELOW 60 | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |

| EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 12:33:17 SDL RUN 1 |                             |                         |                      |                      |   |                         |                      |                      |   |                           |                                 |
|--|-----------------------------|-------------------------|----------------------|----------------------|---|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
| DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #409 ENL BARRACKS W/AS 12:33:17                        |                             |                         |                      |                      |   |                         |                      |                      |   |                           |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-ZN 3&4 TOPEKA, KS                                   |                             |                         |                      |                      |   |                         |                      |                      |   |                           |                                 |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | C O O L I N G           |                      |                      |   | H E A T I N G           |                      |                      |   | E L E C                   |                                 |
|  |                             | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN  | 0.00000                     |                         |                      |                      | 0.000                                   | 15                      | -8. F                | -9. F                | -37.881                                 | 2750.                     | 4.665                           |
| FEB  | 0.00000                     |                         |                      |                      | 0.000                                   | 3                       | -1. F                | -2. F                | -33.571                                 | 2484.                     | 4.665                           |
| MAR  | 0.00000                     |                         |                      |                      | 0.000                                   | 4                       | 14. F                | 12. F                | -26.332                                 | 2752.                     | 4.665                           |
| APR  | 0.00000                     |                         |                      |                      | 0.000                                   | 1                       | 32. F                | 29. F                | -15.251                                 | 2662.                     | 4.665                           |
| MAY  | 7.46482                     | 16                      | 62. F                | 59. F                | 51.430                                  | 8                       | 50. F                | 48. F                | -0.680                                  | 2750.                     | 4.665                           |
| JUN  | 16.70531                    | 19                      | 87. F                | 76. F                | 45.504                                  |                         |                      |                      | 0.000                                   | 2663.                     | 4.665                           |
| JUL  | 21.08891                    | 17                      | 88. F                | 80. F                | 50.891                                  |                         |                      |                      | 0.000                                   | 2749.                     | 4.665                           |
| AUG  | 20.23787                    | 21                      | 95. F                | 77. F                | 48.409                                  |                         |                      |                      | 0.000                                   | 2752.                     | 4.665                           |
| SEP  | 12.41614                    | 5                       | 90. F                | 77. F                | 45.965                                  |                         |                      |                      | 0.000                                   | 2662.                     | 4.665                           |
| OCT  | 0.32934                     | 1                       | 83. F                | 68. F                | 28.421                                  | 2                       | 64. F                | 59. F                | -9.923                                  | 2749.                     | 4.665                           |
| NOV  | 0.00000                     |                         |                      |                      | 0.000                                   | 3                       | 13. F                | 12. F                | -23.858                                 | 2661.                     | 4.665                           |
| DEC  | 0.00000                     |                         |                      |                      | 0.000                                   | 15                      | 4. F                 | 3. F                 | -31.684                                 | 2750.                     | 4.665                           |
| TOTAL  | 78.242                      |                         |                      |                      | 51.430                                  |                         |                      |                      |   | 32384.                    | 4.665                           |
| TAX  |                             |                         |                      |                      |   |                         |                      |                      |   |                           |                                 |

H6-20

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 12:33:17 SDL RUN 1 |                    |                    |                                 |                      |                      |               |                        |                     |                             |  |                                    |
|--|--------------------|--------------------|---------------------------------|----------------------|----------------------|---------------|------------------------|---------------------|-----------------------------|--|------------------------------------|
| DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #409 ENL BARRACKS W/AS 12:33:17                  |                    |                    |                                 |                      |                      |               |                        |                     |                             |  |                                    |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-ZN_3&4 TOPEKA, KS                                |                    |                    |                                 |                      |                      |               |                        |                     |                             |  |                                    |
| MONTH  | HOURS COOLING LOAD | HOURS HEATING LOAD | HOURS COINCIDENT COOL-HEAT LOAD | N U M B E R O F      |                      |               | H O U R S              |                     | --COINCIDENT LOADS--        |  |                                    |
|  |                    |                    |                                 | HOURS HEATING AVAIL. | HOURS COOLING AVAIL. | HOURS FANS ON | HOURS FANS ON CYCLE ON | HOURS NIGHT VENTING | HOURS FLOATING WHEN FANS ON | HEATING LOAD AT COOLING PEAK (KBTU/HR) | ELECTRIC LOAD AT COOLING PEAK (KW) |
| JAN  | 0                  | 744                | 0                               | 744                  | 0                    | 744           | 0                      | 0                   | 0                           | -15.722                                | 2.011                              |
| FEB  | 0                  | 672                | 0                               | 672                  | 0                    | 672           | 0                      | 0                   | 0                           | -15.317                                | 2.011                              |
| MAR  | 0                  | 744                | 0                               | 744                  | 0                    | 744           | 0                      | 0                   | 0                           | -14.588                                | 2.011                              |
| APR  | 0                  | 720                | 0                               | 720                  | 0                    | 720           | 0                      | 0                   | 0                           | -0.823                                 | 2.011                              |
| MAY  | 380                | 360                | 0                               | 360                  | 384                  | 744           | 0                      | 0                   | 4                           | 0.000                                  | 2.011                              |
| JUN  | 714                | 0                  | 0                               | 0                    | 720                  | 720           | 0                      | 0                   | 6                           | 0.000                                  | 4.665                              |
| JUL  | 744                | 0                  | 0                               | 0                    | 744                  | 744           | 0                      | 0                   | 0                           | 0.000                                  | 4.665                              |
| AUG  | 744                | 0                  | 0                               | 0                    | 744                  | 744           | 0                      | 0                   | 0                           | 0.000                                  | 4.665                              |
| SEP  | 612                | 0                  | 0                               | 0                    | 720                  | 720           | 0                      | 0                   | 108                         | 0.000                                  | 4.665                              |
| OCT  | 16                 | 720                | 0                               | 720                  | 24                   | 744           | 0                      | 0                   | 8                           | 0.000                                  | 4.665                              |
| NOV  | 0                  | 720                | 0                               | 720                  | 0                    | 720           | 0                      | 0                   | 0                           | -16.202                                | 2.011                              |
| DEC  | 0                  | 744                | 0                               | 744                  | 0                    | 744           | 0                      | 0                   | 0                           | -12.051                                | 3.190                              |
| ANNUAL   | 3210               | 5424               | 0                               | 5424                 | 3336                 | 8760          | 0                      | 0                   | 126                         |  |                                    |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 12:33:17 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- SS-K SPACE TEMPERATURE SUMMARY MZ-ZN 3&4 TOPEKA, KS

| AVERAGE SPACE TEMPERATURE |               | TEMP              |                   | AVERAGE TEMPERATURE DIFFERENCE |                   | SUMMED TEMP DIFFERENCE          |                                     | HUMIDITY RATIO DIFFERENCE       |                                     |
|---------------------------|---------------|-------------------|-------------------|--------------------------------|-------------------|---------------------------------|-------------------------------------|---------------------------------|-------------------------------------|
| MONTH                     | ALL HOURS (F) | COOLING HOURS (F) | HEATING HOURS (F) | FAN ON HOURS (F)               | FAN OFF HOURS (F) | OUTDOOR& ROOM AIR ALL HOURS (F) | OUTDOOR& ROOM AIR HEATING HOURS (F) | OUTDOOR& ROOM AIR ALL HOURS (F) | OUTDOOR& ROOM AIR HEATING HOURS (F) |
| JAN                       | 74.04         |                   | 74.04             | 74.04                          | 0.00              | -48.22                          | 1494.88                             | 1494.88                         | -0.00255                            |
| FEB                       | 74.08         |                   | 74.08             | 74.08                          | 0.00              | -42.40                          | 1187.20                             | 1187.20                         | -0.00256                            |
| MAR                       | 74.44         |                   | 74.44             | 74.44                          | 0.00              | -34.17                          | 1059.12                             | 1059.12                         | -0.00241                            |
| APR                       | 80.02         |                   | 80.02             | 80.02                          | 0.00              | -23.25                          | 697.60                              | 697.60                          | -0.00257                            |
| MAY                       | 78.98         | 72.22             | 86.19             | 78.98                          | 0.00              | -12.89                          | 352.17                              | 479.32                          | -0.00149                            |
| JUN                       | 71.82         | 71.82             |                   | 71.82                          | 0.00              | 1.83                            |                                     | 213.25                          | 0.00173                             |
| JUL                       | 71.83         | 71.83             |                   | 71.83                          | 0.00              | 5.35                            |                                     | 215.42                          | 0.00333                             |
| AUG                       | 71.83         | 71.83             |                   | 71.83                          | 0.00              | 7.30                            |                                     | 293.30                          | 0.00217                             |
| SEP                       | 71.78         | 71.81             |                   | 71.78                          | 0.00              | -4.24                           |                                     | 304.77                          | 0.00002                             |
| OCT                       | 82.29         | 71.80             | 82.66             | 82.29                          | 0.00              | -24.41                          | 749.61                              | 762.70                          | -0.00263                            |
| NOV                       | 75.66         |                   | 75.66             | 75.66                          | 0.00              | -31.55                          | 946.36                              | 946.36                          | -0.00260                            |
| DEC                       | 74.07         |                   | 74.07             | 74.07                          | 0.00              | -44.02                          | 1364.73                             | 1364.73                         | -0.00254                            |
| ANNUAL                    | 75.08         | 71.87             | 77.06             | 75.08                          | 0.00              | -20.78                          | 7851.67                             | 9018.65                         | -0.00100                            |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 12:33:17 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- SS-O TEMPERATURE SCATTER PLOT MZ-ZN 3&4 FOR TV/POOL\_RM TOPEKA, KS

| HOUR     | TOTAL HOURS AT TEMPERATURE LEVEL AND TIME OF DAY |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     | TOTAL |
|----------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
|          | 1AM  | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 1PM | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  |       |
| ABOVE 85 | 19   | 19  | 15  | 13  | 15  | 15  | 14  | 16  | 18  | 22  | 23  | 25  | 26  | 28  | 31  | 33  | 33  | 33  | 33  | 32  | 30  | 24  | 23  | 23  | 563   |
| 81-85    | 26   | 25  | 28  | 28  | 26  | 27  | 27  | 27  | 26  | 27  | 28  | 32  | 32  | 31  | 28  | 27  | 28  | 27  | 27  | 28  | 28  | 34  | 32  | 26  | 675   |
| 76-80    | 35   | 34  | 33  | 35  | 33  | 32  | 32  | 32  | 36  | 35  | 39  | 37  | 41  | 46  | 51  | 50  | 49  | 51  | 48  | 47  | 46  | 41  | 33  | 35  | 951   |
| 71-75    | 285  | 287 | 289 | 289 | 291 | 291 | 292 | 290 | 285 | 281 | 275 | 271 | 266 | 260 | 255 | 255 | 255 | 254 | 257 | 258 | 261 | 266 | 277 | 281 | 6571  |
| 66-70    | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| 61-65    | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| BELOW 60 | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 12:33:17 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- SS-O TEMPERATURE SCATTER PLOT MZ-ZN 3&4 FOR BASE\_HALL TOPEKA, KS

| HOUR     | TOTAL HOURS AT TEMPERATURE LEVEL AND TIME OF DAY |     |     |     |     |     |     |     |     |     |     |     | TOTAL |
|----------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
|          | 1AM  | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  |       |
| ABOVE 85 | 19   | 18  | 15  | 15  | 15  | 15  | 16  | 16  | 16  | 20  | 21  | 21  | 23    |
| 81-85    | 25   | 26  | 28  | 27  | 26  | 26  | 26  | 28  | 29  | 26  | 28  | 29  | 29    |
| 76-80    | 38   | 36  | 35  | 35  | 36  | 36  | 35  | 35  | 35  | 38  | 37  | 40  | 41    |
| 71-75    | 283  | 285 | 287 | 288 | 288 | 288 | 288 | 286 | 285 | 281 | 279 | 275 | 273   |
| 66-70    | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| 61-65    | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| BELOW 60 | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |

HOURLY DATA FILE 1FROM PROG 2

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 12:33:17 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- PV-A EQUIPMENT SIZES TOPEKA, KS

| EQUIPMENT     | NUMBER |       | NUMBER |       | NUMBER |       | NUMBER |       | NUMBER |       | NUMBER |       |
|---------------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
|               | SIZE   | INSTD | SIZE   | INSTD | SIZE   | INSTD | SIZE   | INSTD | SIZE   | INSTD | SIZE   | INSTD |
| STM-BOILER    | 0.179  | 1     | 1      |       |        |       |        |       |        |       |        |       |
| HERM-REC-CHLR | 0.103  | 2     | 2      |       |        |       |        |       |        |       |        |       |



EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 12:33:17 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE BASELINE SIMULATION FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY                | NATURAL-GAS               |
|-----|--|----------------------------|---------------------------|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 35.771<br>58.087<br>31/13  | 90.629<br>232.643<br>15/6 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 32.159<br>58.087<br>28/11  | 65.336<br>205.008<br>3/5  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 34.768<br>58.087<br>31/11  | 43.348<br>165.728<br>4/5  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 32.348<br>58.087<br>5/8    | 8.531<br>105.989<br>1/1   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 43.246<br>113.673<br>31/18 | 1.753<br>12.035<br>10/23  |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 56.064<br>113.519<br>27/19 | 0.000<br>0.000<br>30/1    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 62.897<br>121.901<br>23/16 | 0.000<br>0.000<br>31/1    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 62.670<br>119.834<br>21/17 | 0.000<br>0.000<br>31/1    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 48.402<br>113.566<br>5/18  | 0.000<br>0.000<br>30/1    |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.687<br>84.867<br>1/17   | 7.413<br>93.794<br>20/8   |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.427<br>58.087<br>30/20  | 35.607<br>158.786<br>3/5  |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 35.647<br>58.087<br>31/22  | 79.965<br>204.990<br>15/2 |
|     | ONE YEAR<br>USE/PEAK                             | 511.088<br>121.901         | 332.581<br>232.643        |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 12:33:17 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 12.02       | 332.58      |
| SPACE COOL      | 110.74      | 0.00        |
| HVAC AUX        | 212.29      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 111.39      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 64.67       | 0.00        |
| TOTAL           | 511.11      | 332.58      |

TOTAL SITE ENERGY 843.67 MBTU 159.1 KBTU/SQFT-YR GROSS-AREA 159.1 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1867.38 MBTU 352.1 KBTU/SQFT-YR GROSS-AREA 352.1 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.7  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.1  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 23.5  
 OVERHANG-D = 9. ..

E-W HEIGHT = 4.0 WIDTH = 17.0 CONS = EXWALL  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 4.0 WIDTH = 10.0 CONS = EXWALL  
 AZIMUTH = 45 INSIDE-VIS-REFL = 0.2 ..

WINDOW HEIGHT = 3.0 WIDTH = 3.5 G-T = SP\_W/\_ST  
 SETBACK = 1.0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 OVERHANG-A = 10.  
 OVERHANG-W = 23.5 OVERHANG-D = 9. ..

U-W HEIGHT = 9.0 WIDTH = 23.0 CONS = FLOOR  
 AZIMUTH = 225 ..

U-W HEIGHT = 9.0 WIDTH = 17.0 CONS = FLOOR  
 AZIMUTH = 135 ..

U-W HEIGHT = 9.0 WIDTH = 10.0 CONS = FLOOR  
 AZIMUTH = 45 ..

U-W HEIGHT = 16.0 WIDTH = 51.5 CONS = FLOOR ..

END ..  
 COMPUTE LOADS ..  
 INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

|                |          |   |           |       |      |
|----------------|----------|---|-----------|-------|------|
| TITLE          | LINE-1 * | EMC                                       | ENGINEERS | INC.  | *    |
|                | LINE-2 * | EZDOE - ELITE SOFTWARE DEVELOPMENT INC*   |           |       |      |
|                | LINE-3 * | DENVER,                                   | CO        | 80227 | *    |
|                | LINE-4 * | <u>RUN #1 NIGHT SETBACK FOR BLDG #409</u> |           |       | *    |
|                | LINE-5 * | ENL BARRACKS W/AS                         |           |       | * .. |
| ABORT          |          | ERRORS ..                                 |           |       |      |
| DIAGNOSTIC     |          | WARNINGS ..                               |           |       |      |
| SYSTEMS-REPORT |          | VERIFICATION=(SV-A)                       |           |       |      |
|                |          | SUMMARY=(SS-A,SS-C,SS-K,SS-O)             |           |       |      |
|                |          | HOURLY-DATA-SAVE = YES ..                 |           |       |      |

# \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

```

SD_WT_HT  =DAY-SCHEDULE (1,4) (65.)
              (5,21) (74.)
              (22,24) (65.) ..
SD_SM_CL  =DAY-SCHEDULE (1,24) (72.) ..
SD_WT_CL  =DAY-SCHEDULE (1,4) (65.2)
              (5,16) (74.2)
              (17) (74.27)
              (18,21) (74.2)
              (22,24) (65.2) ..
SD_SM_HT  =DAY-SCHEDULE (1,24) (71.8) ..
SD_OA_FRAC =DAY-SCHEDULE (1,24) (0.14) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON  ..

SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF  ..

SW_WT_HT   =WEEK-SCHEDULE (ALL) SD_WT_HT ..


SW_SM_CL   =WEEK-SCHEDULE (ALL) SD_SM_CL ..

SW_WT_CL   =WEEK-SCHEDULE (ALL) SD_WT_CL ..

SW_SM_HT   =WEEK-SCHEDULE (ALL) SD_SM_HT ..

SW_OA_FRAC =WEEK-SCHEDULE (ALL) SD_OA_FRAC ..

```



## \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

S\_HRLY-RPT =SCHEDULE THRU JAN 20 SW\_OFF  
 THRU JAN 21 SW\_ON  
 THRU AUG 14 SW\_OFF

THRU AUG 15 SW\_ON  
THRU DEC 31 SW\_OFF ..

S\_OA\_FRACT =SCHEDULE THRU DEC 31 SW\_OA\_FRAC ..

\$ ZONE DESCRIPTION

SW\_ROOMS =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

NE\_ROOMS =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

TV/POOL\_RM =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

BASE\_HALL =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

\$ SYSTEM DESCRIPTION

MZ-ZN\_1&2 =SYSTEM SYSTEM-TYPE = MZS  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE-SCHED  
COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
HEAT-CONTROL = COLDEST COOL-CONTROL = WARMEST  
OA-CONTROL = FIXED SUPPLY-CFM = 6115.  
RATED-CFM = 6115. MIN-OUTSIDE-AIR = 0.14  
MIN-AIR-SCH = S\_OA\_FRACT MAX-OA-FRACTION = 0.14  
SUPPLY-DELTA-T = 2.7 SUPPLY-KW = 0.00088  
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 151000.  
COOL-SH-CAP = 127000. HEATING-CAPACITY = -174600.  
RETURN-AIR-PATH = DUCT  
ZONE-NAMES = (SW\_ROOMS, NE\_ROOMS) ..

MZ-ZN\_3&4 =SYSTEM SYSTEM-TYPE = MZS  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE-SCHED  
COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0

HEAT-CONTROL = COLDEST COOL-CONTROL = WARMEST  
 OA-CONTROL = FIXED SUPPLY-CFM = 1950.  
 RATED-CFM = 1950. MIN-OUTSIDE-AIR = 0.14  
 MIN-AIR-SCH = S\_OA\_FRACT MAX-OA-FRACTION = 0.14  
 SUPPLY-DELTA-T = 2.7 SUPPLY-KW = 0.00088  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 50400.  
 COOL-SH-CAP = 40700. HEATING-CAPACITY = -42200.  
 RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (TV/POOL\_RM, BASE\_HALL) ..

## \$ HOURLY REPORT DESCRIPTION

ZONE1-BLK =REPORT-BLOCK VARIABLE-TYPE = SW\_ROOMS  
                     VARIABLE-LIST = (17,18,7,6) ..  
 ZONE3-BLK =REPORT-BLOCK VARIABLE-TYPE = TV/POOL\_RM  
                     VARIABLE-LIST = (17,18,7,6) ..  
 AHU-1-BLK =REPORT-BLOCK VARIABLE-TYPE = MZ-ZN\_1&2  
                     VARIABLE-LIST = (3,5,6,18,19,17) ..  
 AHU-2-BLK =REPORT-BLOCK VARIABLE-TYPE = MZ-ZN\_3&4  
                     VARIABLE-LIST = (3,5,6,18,19,17) ..  
 HRLY-ZN-1 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                     REPORT-BLOCK = (ZONE1-BLK)  
 ..  
 HRLY-ZN-3 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                     REPORT-BLOCK = (ZONE3-BLK)  
 ..  
 HRLY-AHU-1 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                     REPORT-BLOCK = (AHU-1-BLK)  
 ..  
 HRLY-AHU-2 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                     REPORT-BLOCK = (AHU-2-BLK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #1 NIGHT SETBACK FOR BLDG #409 \*  
 LINE-5 \*ENL BARRACKS W/AS \* ..  
 ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 13:18: 7 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG #409 ENL BARRACKS W/AS TOPEKA, KS               |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-ZN_1&2  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----                                    |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN  | 0.00000                     |                         |                      |                      | -44.767                     | 15                      | -8. F                | -9. F                | -158.822                                | 6908.                              | 11.194                          |
| FEB  | 0.00000                     |                         |                      |                      | -29.927                     | 3                       | -1. F                | -2. F                | -139.190                                | 6240.                              | 11.194                          |
| MAR  | 0.00000                     |                         |                      |                      | -18.265                     | 4                       | 14. F                | 12. F                | -111.514                                | 6911.                              | 11.194                          |
| APR  | 0.00000                     |                         |                      |                      | -2.723                      | 5                       | 31. F                | 29. F                | -60.163                                 | 6687.                              | 11.194                          |
| MAY  | 24.47659                    | 31 18                   | 90. F                | 76. F                | -0.350                      | 10 23                   | 60. F                | 56. F                | -4.689                                  | 6908.                              | 11.194                          |
| JUN  | 59.06521                    | 27 17                   | 89. F                | 77. F                | 0.000                       |                         |                      |                      | 0.000                                   | 6688.                              | 11.194                          |
| JUL  | 73.11463                    | 23 18                   | 95. F                | 79. F                | 0.000                       |                         |                      |                      | 0.000                                   | 6907.                              | 11.194                          |
| AUG  | 69.58331                    | 22 17                   | 95. F                | 77. F                | 0.000                       |                         |                      |                      | 0.000                                   | 6911.                              | 11.194                          |
| SEP  | 38.96878                    | 5 18                    | 90. F                | 77. F                | 0.000                       |                         |                      |                      | 0.000                                   | 6687.                              | 11.194                          |
| OCT  | 0.70920                     | 1 18                    | 83. F                | 68. F                | -2.513                      | 20 5                    | 25. F                | 25. F                | -72.644                                 | 6907.                              | 11.194                          |
| NOV  | 0.00000                     |                         |                      |                      | -15.512                     | 3 5                     | 13. F                | 12. F                | -108.116                                | 6685.                              | 11.194                          |
| DEC  | 0.00000                     |                         |                      |                      | -38.599                     | 13 6                    | 2. F                 | 1. F                 | -138.847                                | 6908.                              | 11.194                          |
| TOTAL  | 265.917                     |                         |                      |                      | -152.655                    |                         |                      |                      | -158.822                                | 81351.                             | 11.194                          |
| TAX  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 13:18: 7 SDL RUN 1 |                          |                          |  |                   |                            |                            |                           |                           |                                      |  |  |
|--|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|---------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG #409 ENL BARRACKS W/AS TOPEKA, KS               |                          |                          |  |                   |                            |                            |                           |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-ZN_1&2   |                          |                          |  |                   |                            |                            |                           |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----  |                          |                          |  |                   |                            |                            |                           |                           |                                      |  |  |
| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | --COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN  | 0                        | 744                      | 0  | 0                 | 744                        | 0                          | 744                       | 0                         | 0                                    | -9.147   | 5.963  |
| FEB  | 0                        | 670                      | 0  | 2                 | 672                        | 0                          | 672                       | 0                         | 2                                    | -7.102   | 5.963  |
| MAR  | 0                        | 672                      | 0  | 72                | 744                        | 0                          | 744                       | 0                         | 72                                   | -3.390   | 5.963  |
| APR  | 0                        | 421                      | 0  | 299               | 720                        | 0                          | 720                       | 0                         | 299                                  | -4.626   | 5.963  |
| MAY  | 384                      | 177                      | 0  | 183               | 360                        | 384                        | 744                       | 0                         | 183                                  | 0.000  | 11.194   |
| JUN  | 720                      | 0                        | 0  | 0                 | 0                          | 720                        | 720                       | 0                         | 0                                    | 0.000  | 11.194   |
| JUL  | 744                      | 0                        | 0  | 0                 | 0                          | 744                        | 744                       | 0                         | 0                                    | 0.000  | 11.194   |
| AUG  | 744                      | 0                        | 0  | 0                 | 0                          | 744                        | 744                       | 0                         | 0                                    | 0.000  | 11.194   |
| SEP  | 671                      | 0                        | 0  | 49                | 720                        | 744                        | 720                       | 0                         | 49                                   | 0.000  | 11.194   |
| OCT  | 16                       | 471                      | 0  | 257               | 720                        | 24                         | 744                       | 0                         | 257                                  | 0.000  | 11.194   |
| NOV  | 0                        | 627                      | 0  | 93                | 720                        | 0                          | 720                       | 0                         | 93                                   | -17.212  | 5.963  |
| DEC  | 0                        | 744                      | 0  | 0                 | 744                        | 0                          | 744                       | 0                         | 0                                    | -22.691  | 8.288  |
| ANNUAL   | 3279                     | 4526                     | 0  | 955               | 5424                       | 3336                       | 8760                      | 0                         | 955                                  |  |  |

EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 13:18: 7 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #1 NIGHT SETBACK FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO                   | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|----------------------|--|---|---|
| JAN                  | 35.750<br>58.590<br>31/14                        | 35.750<br>58.590<br>31/14                           | 83.978<br>262.395<br>15/ 6                          |
| FEB                  | 32.024<br>58.590<br>28/12                        | 32.024<br>58.590<br>28/12                           | 59.166<br>237.250<br>3/ 6                           |
| MAR                  | 34.573<br>58.590<br>31/12                        | 34.573<br>58.590<br>31/12                           | 37.875<br>205.279<br>4/ 6                           |
| APR                  | 32.247<br>58.590<br>5/ 8                         | 32.247<br>58.590<br>5/ 8                            | 6.593<br>127.532<br>1/ 5                            |
| MAY                  | 43.247<br>113.543<br>31/18                       | 43.247<br>113.543<br>31/18                          | 1.242<br>12.338<br>10/23                            |
| JUN                  | 56.153<br>113.435<br>27/19                       | 56.153<br>113.435<br>27/19                          | 0.000<br>0.000<br>30/ 1                             |
| JUL                  | 62.926<br>121.764<br>23/16                       | 62.926<br>121.764<br>23/16                          | 0.000<br>0.000<br>31/ 1                             |
| AUG                  | 62.701<br>119.602<br>21/17                       | 62.701<br>119.602<br>21/17                          | 0.000<br>0.000<br>31/ 1                             |
| SEP                  | 48.643<br>113.460<br>5/18                        | 48.643<br>113.460<br>5/18                           | 0.000<br>0.000<br>30/ 1                             |
| OCT                  | 33.622<br>93.240<br>1/18                         | 33.622<br>93.240<br>1/18                            | 5.977<br>115.904<br>20/ 5                           |
| NOV                  | 33.249<br>58.590<br>30/20                        | 33.249<br>58.590<br>30/20                           | 30.802<br>200.546<br>3/ 5                           |
| DEC                  | 35.568<br>58.590<br>31/21                        | 35.568<br>58.590<br>31/21                           | 73.358<br>239.898<br>13/ 6                          |
| ONE YEAR<br>USE/PEAK | 510.701<br>121.764                               | 510.701<br>121.764                                  | 298.992<br>262.395                                  |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 13:18: 7 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 11.21       | 298.99      |
| SPACE COOL      | 111.16      | 0.00        |
| HVAC AUX        | 212.29      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 111.39      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 64.67       | 0.00        |
| TOTAL           | 510.72      | 298.99      |

TOTAL SITE ENERGY 809.69 MBTU 152.7 KBTU/SQFT-YR GROSS-AREA 152.7 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1832.63 MBTU 345.5 KBTU/SQFT-YR GROSS-AREA 345.5 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 2.1  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.1  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 23.5  
 OVERHANG-D = 9. ..

E-W HEIGHT = 4.0 WIDTH = 17.0 CONS = EXWALL  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 4.0 WIDTH = 10.0 CONS = EXWALL  
 AZIMUTH = 45 INSIDE-VIS-REFL = 0.2 ..

WINDOW HEIGHT = 3.0 WIDTH = 3.5 G-T = SP\_W/\_ST  
 SETBACK = 1.0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 OVERHANG-A = 10.  
 OVERHANG-W = 23.5 OVERHANG-D = 9. ..

U-W HEIGHT = 9.0 WIDTH = 23.0 CONS = FLOOR  
 AZIMUTH = 225 ..

U-W HEIGHT = 9.0 WIDTH = 17.0 CONS = FLOOR  
 AZIMUTH = 135 ..

U-W HEIGHT = 9.0 WIDTH = 10.0 CONS = FLOOR  
 AZIMUTH = 45 ..

U-W HEIGHT = 16.0 WIDTH = 51.5 CONS = FLOOR ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #2 DDC CONTROL FOR BLDG #409 \*

LINE-5 \*ENL BARRACKS W/AS \* ..

ABORT ERRORS ..

DIAGNOSTIC WARNINGS ..

SYSTEMS-REPORT VERIFICATION=(SV-A)

SUMMARY=(SS-A,SS-C,SS-K,SS-O)


HOURLY-DATA-SAVE = YES ..

# \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..

SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

|            |               |        |        |    |
|------------|---------------|--------|--------|----|
| SD_WT_HT   | =DAY-SCHEDULE | (1,24) | (70.)  | .. |
| SD_SM_CL   | =DAY-SCHEDULE | (1,24) | (76.)  | .. |
| SD_WT_CL   | =DAY-SCHEDULE | (1,24) | (70.2) | .. |
| SD_SM_HT   | =DAY-SCHEDULE | (1,24) | (75.8) | .. |
| SD_OA_FRAC | =DAY-SCHEDULE | (1,24) | (0.14) | .. |



SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..

SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..

SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..

SW\_OA\_FRAC =WEEK-SCHEDULE (ALL) SD\_OA\_FRAC ..

## \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
THRU OCT 1 SW\_OFF  
THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_HRLY-RPT =SCHEDULE THRU JAN 20 SW\_OFF

THRU JAN 21 SW\_ON

THRU AUG 14 SW\_OFF

THRU AUG 15 SW\_ON

THRU DEC 31 SW\_OFF ..

S\_OA\_FRACT =SCHEDULE THRU DEC 31 SW\_OA\_FRAC ..

## \$ ZONE DESCRIPTION

SW\_ROOMS =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

NE\_ROOMS =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

TV/POOL\_RM =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

BASE\_HALL =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ-ZN\_1&2 =SYSTEM SYSTEM-TYPE = MZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 HEAT-CONTROL = COLDEST COOL-CONTROL = WARMEST  
 OA-CONTROL = FIXED SUPPLY-CFM = 6115.  
 RATED-CFM = 6115. MIN-OUTSIDE-AIR = 0.14  
 MIN-AIR-SCH = S\_OA\_FRACT MAX-OA-FRACTION = 0.14  
 SUPPLY-DELTA-T = 2.7 SUPPLY-KW = 0.00088  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 151000.  
 COOL-SH-CAP = 127000. HEATING-CAPACITY = -174600.  
 RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (SW\_ROOMS, NE\_ROOMS) ..

MZ-ZN\_3&4 =SYSTEM SYSTEM-TYPE = MZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 HEAT-CONTROL = COLDEST COOL-CONTROL = WARMEST  
 OA-CONTROL = FIXED SUPPLY-CFM = 1950.  
 RATED-CFM = 1950. MIN-OUTSIDE-AIR = 0.14  
 MIN-AIR-SCH = S\_OA\_FRACT MAX-OA-FRACTION = 0.14  
 SUPPLY-DELTA-T = 2.7 SUPPLY-KW = 0.00088  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW

NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 50400.  
 COOL-SH-CAP = 40700. HEATING-CAPACITY = -42200.  
 RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (TV/POOL\_RM, BASE\_HALL) ..

## \$ HOURLY REPORT DESCRIPTION

ZONE1-BLK =REPORT-BLOCK VARIABLE-TYPE = SW\_ROOMS  
                   VARIABLE-LIST = (17,18,7,6) ..  
 ZONE3-BLK =REPORT-BLOCK VARIABLE-TYPE = TV/POOL\_RM  
                   VARIABLE-LIST = (17,18,7,6) ..  
 AHU-1-BLK =REPORT-BLOCK VARIABLE-TYPE = MZ-ZN\_1&2  
                   VARIABLE-LIST = (3,5,6,18,19,17) ..  
 AHU-2-BLK =REPORT-BLOCK VARIABLE-TYPE = MZ-ZN\_3&4  
                   VARIABLE-LIST = (3,5,6,18,19,17) ..  
 HRLY-ZN-1 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                   REPORT-BLOCK = (ZONE1-BLK)  
 ..  
 HRLY-ZN-3 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                   REPORT-BLOCK = (ZONE3-BLK)  
 ..  
 HRLY-AHU-1 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                   REPORT-BLOCK = (AHU-1-BLK)  
 ..  
 HRLY-AHU-2 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                   REPORT-BLOCK = (AHU-2-BLK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #2 DDC CONTROL FOR BLDG #409 \*  
 LINE-5 \*ENL BARRACKS W/AS \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
 SUMMARY=(PS-B,BEPS)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 13:24:29 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG #409 ENL BARRACKS W/AS 13:24:29 SDL RUN 1         |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-ZN_1&2 TOPEKA, KS                             |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----                                    |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN  | 0.00000                     |                         |                      |                      | -42.631                     | 15                      | 6                    | -8.F                 | -9.F                                    | 6908.                              | 11.194                          |
| FEB  | 0.00000                     |                         |                      |                      | -27.723                     | 3                       | 5                    | -1.F                 | -2.F                                    | 6240.                              | 11.194                          |
| MAR  | 0.00000                     |                         |                      |                      | -15.679                     | 4                       | 5                    | 14.F                 | 12.F                                    | 6911.                              | 11.194                          |
| APR  | 0.00000                     |                         |                      |                      | -1.909                      | 1                       | 1                    | 32.F                 | 29.F                                    | 6687.                              | 11.194                          |
| MAY  | 19.97078                    | 31                      | 18                   | 90.F                 | 76.F                        | 10                      | 23                   | 60.F                 | 56.F                                    | 6908.                              | 11.194                          |
| JUN  | 50.25921                    | 27                      | 17                   | 89.F                 | 77.F                        |                         |                      |                      | 0.000                                   | 6688.                              | 11.194                          |
| JUL  | 63.75431                    | 23                      | 17                   | 97.F                 | 79.F                        |                         |                      |                      | 0.000                                   | 6907.                              | 11.194                          |
| AUG  | 60.45490                    | 22                      | 17                   | 95.F                 | 77.F                        |                         |                      |                      | 0.000                                   | 6911.                              | 11.194                          |
| SEP  | 31.18378                    | 5                       | 18                   | 90.F                 | 77.F                        |                         |                      |                      | 0.000                                   | 6687.                              | 11.194                          |
| OCT  | 0.44644                     | 1                       | 18                   | 83.F                 | 68.F                        | 20                      | 8                    | 23.F                 | 22.F                                    | 6907.                              | 11.194                          |
| NOV  | 0.00000                     |                         |                      |                      | -13.381                     | 3                       | 5                    | 13.F                 | 12.F                                    | 6685.                              | 11.194                          |
| DEC  | 0.00000                     |                         |                      |                      | -36.234                     | 15                      | 2                    | 3.F                  | 2.F                                     | 6908.                              | 11.194                          |
| TOTAL  | 226.069                     |                         |                      |                      | -139.467                    |                         |                      |                      |   | 81351.                             |                                 |
| MAX  |                             |                         |                      |                      |                             |                         |                      |                      | -130.790                                |                                    | 11.194                          |

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| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 13:24:29 SDL RUN 1 |                          |                          |  |                            |                            |                              |                           |                                      |  |  |
|--|--------------------------|--------------------------|--|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG #409 ENL BARRACKS W/AS                            |                          |                          |  |                            |                            |                              |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-ZN 1&2 TOPEKA, KS                                |                          |                          |  |                            |                            |                              |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----  |                          |                          |  |                            |                            |                              |                           |                                      |  |  |
| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN  | 0                        | 744                      | 0  | 744                        | 0                          | 744                          | 0                         | 0                                    | -48.207  | 5.963  |
| FEB  | 0                        | 659                      | 0  | 672                        | 0                          | 672                          | 0                         | 13                                   | -44.574  | 5.963  |
| MAR  | 0                        | 613                      | 0  | 744                        | 0                          | 744                          | 0                         | 131                                  | -41.418  | 5.963  |
| APR  | 0                        | 394                      | 0  | 720                        | 0                          | 720                          | 0                         | 326                                  | -4.626   | 5.963  |
| MAY  | 384                      | 176                      | 0  | 360                        | 384                        | 744                          | 0                         | 184                                  | 0.000  | 11.194   |
| JUN  | 719                      | 0                        | 0  | 0                          | 720                        | 720                          | 0                         | 1                                    | 0.000  | 11.194   |
| JUL  | 744                      | 0                        | 0  | 0                          | 744                        | 744                          | 0                         | 0                                    | 0.000  | 11.194   |
| AUG  | 744                      | 0                        | 0  | 0                          | 744                        | 744                          | 0                         | 0                                    | 0.000  | 11.194   |
| SEP  | 615                      | 0                        | 0  | 0                          | 720                        | 720                          | 0                         | 105                                  | 0.000  | 11.194   |
| OCT  | 14                       | 440                      | 0  | 720                        | 24                         | 744                          | 0                         | 290                                  | 0.000  | 11.194   |
| NOV  | 0                        | 579                      | 0  | 720                        | 0                          | 720                          | 0                         | 141                                  | -54.599  | 5.963  |
| DEC  | 0                        | 739                      | 0  | 744                        | 0                          | 744                          | 0                         | 5                                    | -59.243  | 8.288  |
| ANNUAL   | 3220                     | 4344                     | 0  | 5424                       | 3336                       | 8760                         | 0                         | 1196                                 |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 13:24:29 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-ZN\_3&4 TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -9.376                      | 15                      | -8.F                 | -9.F                 | -35.569                                 | 2750.                              | 4.665                           |
| FEB   | 0.00000                     |                         |                      |                      | -6.149                      | 3                       | -1.F                 | -2.F                 | -31.171                                 | 2484.                              | 4.665                           |
| MAR   | 0.00000                     |                         |                      |                      | -3.091                      | 4                       | 14.F                 | 12.F                 | -23.809                                 | 2752.                              | 4.665                           |
| APR   | 0.00000                     |                         |                      |                      | -0.129                      | 1                       | 32.F                 | 29.F                 | -12.350                                 | 2662.                              | 4.665                           |
| MAY   | 6.18017                     | 16                      | 62.F                 | 59.F                 | -0.027                      | 8                       | 50.F                 | 48.F                 | -0.659                                  | 2750.                              | 4.665                           |
| JUN   | 14.29015                    | 27                      | 88.F                 | 76.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 2663.                              | 4.665                           |
| JUL   | 18.43104                    | 17                      | 88.F                 | 80.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 2749.                              | 4.665                           |
| AUG   | 17.69712                    | 21                      | 95.F                 | 77.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 2752.                              | 4.665                           |
| SEP   | 10.25095                    | 5                       | 90.F                 | 77.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 2662.                              | 4.665                           |
| OCT   | 0.24603                     | 1                       | 83.F                 | 68.F                 | -0.049                      | 19                      | 32.F                 | 29.F                 | -0.734                                  | 2749.                              | 4.665                           |
| NOV   | 0.00000                     |                         |                      |                      | -1.494                      | 3                       | 13.F                 | 12.F                 | -20.882                                 | 2661.                              | 4.665                           |
| DEC   | 0.00000                     |                         |                      |                      | -7.323                      | 15                      | 4.F                  | 3.F                  | -29.202                                 | 2750.                              | 4.665                           |
| TOTAL | 67.095                      |                         |                      |                      | -27.638                     |                         |                      |                      | -35.569                                 | 32384.                             | 4.665                           |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 13:24:29 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- SS-C SYSTEM MONTHLY LOADS SUMMARY FOR MZ-ZN\_3&4 TOPEKA, KS

| MONTH  | HOURS           |                 |                   |                    | HOURS    |                   |                   |        | HOURS            |                  |                             |  | COINCIDENT LOADS--                                 |                                    |                                    |                                    |
|--------|-----------------|-----------------|-------------------|--------------------|----------|-------------------|-------------------|--------|------------------|------------------|-----------------------------|--|--|------------------------------------|------------------------------------|------------------------------------|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | COINCIDENT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | AVAIL. | FANS ON<br>CYCLE | NIGHT<br>VENTING | FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | LOAD AT<br>COOLING<br>PEAK<br>(KW) | LOAD AT<br>COOLING<br>PEAK<br>(KW) | LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0               | 717             | 0                 | 0                  | 27       | 744               | 0                 | 0      | 0                | 0                | 27                          | -12.939  | -12.939  | 2.011                              | 2.011                              | 2.011                              |
| FEB    | 0               | 623             | 0                 | 0                  | 49       | 672               | 0                 | 0      | 0                | 0                | 49                          | -11.647  | -11.647  | 2.011                              | 2.011                              | 2.011                              |
| MAR    | 0               | 491             | 0                 | 0                  | 253      | 744               | 0                 | 0      | 0                | 0                | 253                         | -11.641  | -11.641  | 2.011                              | 2.011                              | 2.011                              |
| APR    | 0               | 261             | 0                 | 0                  | 459      | 720               | 0                 | 0      | 0                | 0                | 459                         | -0.802   | -0.802   | 2.011                              | 2.011                              | 2.011                              |
| MAY    | 370             | 131             | 0                 | 0                  | 243      | 744               | 384               | 0      | 0                | 0                | 243                         | 0.000  | 0.000  | 2.011                              | 2.011                              | 2.011                              |
| JUN    | 711             | 0               | 0                 | 0                  | 9        | 720               | 720               | 0      | 0                | 0                | 9                           | 0.000  | 0.000  | 4.665                              | 4.665                              | 4.665                              |
| JUL    | 744             | 0               | 0                 | 0                  | 0        | 744               | 744               | 0      | 0                | 0                | 0                           | 0.000  | 0.000  | 4.665                              | 4.665                              | 4.665                              |
| AUG    | 744             | 0               | 0                 | 0                  | 0        | 744               | 744               | 0      | 0                | 0                | 0                           | 0.000  | 0.000  | 4.665                              | 4.665                              | 4.665                              |
| SEP    | 626             | 0               | 0                 | 0                  | 94       | 720               | 720               | 0      | 0                | 0                | 94                          | 0.000  | 0.000  | 4.665                              | 4.665                              | 4.665                              |
| OCT    | 16              | 259             | 0                 | 0                  | 469      | 720               | 24                | 0      | 0                | 0                | 469                         | 0.000  | 0.000  | 4.665                              | 4.665                              | 4.665                              |
| NOV    | 0               | 362             | 0                 | 0                  | 358      | 720               | 0                 | 0      | 0                | 0                | 358                         | -13.393  | -13.393  | 2.011                              | 2.011                              | 2.011                              |
| DEC    | 0               | 656             | 0                 | 0                  | 88       | 744               | 0                 | 0      | 0                | 0                | 88                          | -9.299   | -9.299   | 3.190                              | 3.190                              | 3.190                              |
| ANNUAL | 3211            | 3500            | 0                 | 0                  | 2049     | 5424              | 3336              | 8760   | 0                | 0                | 2049                        |  |  |                                    |                                    |                                    |



EMC ENGINEERS INC. 80227 EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 13:24:29 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #2 DDC CONTROL FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|-----|--|---|---|
| JAN | 35.472<br>57.846<br>31/12                        | 78.122<br>218.429<br>15/6                           | 53.859<br>190.221<br>3/5                            |
| FEB | 31.847<br>57.846<br>28/10                        | 31.295<br>150.481<br>4/5                            | 4.557<br>89.251<br>1/1                              |
| MAR | 34.305<br>57.846<br>31/10                        | 1.136<br>11.769<br>10/23                            | 0.000<br>0.000<br>30/1                              |
| APR | 32.153<br>56.732<br>5/8                          | 0.000<br>0.000<br>31/1                              | 0.000<br>0.000<br>31/1                              |
| MAY | 41.578<br>108.678<br>31/18                       | 0.000<br>0.000<br>31/1                              | 0.000<br>0.000<br>31/1                              |
| JUN | 52.754<br>108.625<br>27/19                       | 0.000<br>0.000<br>31/1                              | 0.000<br>0.000<br>31/1                              |
| JUL | 59.349<br>116.817<br>23/16                       | 0.000<br>0.000<br>31/1                              | 0.000<br>0.000<br>31/1                              |
| AUG | 59.180<br>114.465<br>21/17                       | 0.000<br>0.000<br>31/1                              | 0.000<br>0.000<br>31/1                              |
| SEP | 45.666<br>108.444<br>5/18                        | 0.000<br>0.000<br>31/1                              | 0.000<br>0.000<br>31/1                              |
| OCT | 33.424<br>79.978<br>1/18                         | 3.965<br>79.697<br>20/8                             | 25.538<br>143.217<br>3/5                            |
| NOV | 33.050<br>57.846<br>30/20                        | 67.172<br>189.885<br>15/2                           |   |
| DEC | 35.307<br>57.846<br>31/22                        |   |   |
|     | ONE YEAR<br>USE/PEAK                             | 494.085<br>116.817                                  | 265.643<br>218.429                                  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/12/1995 13:24:29 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG #409 ENL BARRACKS W/AS  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 9.82        | 265.64      |
| SPACE COOL      | 95.93       | 0.00        |
| HVAC AUX        | 212.29      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 111.39      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 64.67       | 0.00        |
| TOTAL           | 494.10      | 265.64      |

TOTAL SITE ENERGY 759.73 MBTU 143.2 KBTU/SQFT-YR GROSS-AREA 143.2 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1749.38 MBTU 329.8 KBTU/SQFT-YR GROSS-AREA 329.8 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 1.4  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.1  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

**COMPUTER ENERGY SIMULATIONS**

**BLDG. 7108  
BATTALION BUILDINGS**



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

BUILDING NO.:  
BLDG. TYPE:

7108  
BN ADMIN & CLRM

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

### ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3    | RUN4    | RUN5    |
|----------------|---------|---------|---------|---------|---------|---------|
| HEATING (MBtu) | 545.6   | 427.9   | 448.9   | 424.7   | 471.2   | 460.9   |
| COOLING (kWH)  | 176,387 | 133,302 | 170,457 | 131,280 | 175,209 | 173,454 |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 8,133 CFM                         |
| FLOOR AREA     | 12,179 FT²                        |
| CFMI           | 813 CFM                           |
| UA             | 3215 BTU/HR-°F                    |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

#### EZDOE COMPUTER RUN DEFINITION:

|         |                             |
|---------|-----------------------------|
| BASERUN | EXISTING OPERATION          |
| RUN1    | NIGHT SETBACK               |
| RUN2    | DDC CONTROL                 |
| RUN3    | ECONOMIZER                  |
| RUN4    | NIGHTTIME INFILTRATION (OA) |
| RUN5    | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      |            | ANNUAL HEATING & COOLING HOURS |            |
|--------------------|-------------------|------|------------|--------------------------------|------------|
| M-F                | 700               | 1800 | 55 HR      | HR. ON HEATING                 | 1946 HR/YR |
| SAT.               | 700               | 1200 | 5 HR       | HR. ON COOLING                 | 1183 HR/YR |
| SUN.               | 0                 | 0    | 0 HR       | HR. OFF HEATING                | 3502 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 60 HR/WK   | HR. OFF COOLING                | 2129 HR/YR |
|                    | TOTAL UNOCC. HR.  |      | 108 HR/WK  |                                |            |
|                    | ANNUAL OCCUPY HR. |      | 3129 HR/YR |                                |            |
|                    | ANNUAL UNOCC. HR. |      | 5631 HR/YR |                                |            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING

8760 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY

5448 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

3312 HR/YR

HRS SAVED (HTG ONLY)

5448

1946

=

3502 HR/YR

HRS SAVED (CLG ONLY)

3312

1183

=

2129 HR/YR

|           |   |   |               |   |                     |
|-----------|---|---|---------------|---|---------------------|
| HOAUHC    | 545.61 MBtu   | - | 471.24 MBtu   | = | 1.62E+01 Btu/CFM-HR |
|           | 813.3 CFM   | x | 5631 HR/YR    |   |                     |
| HOAUH     | 545.61 MBtu   | - | 471.24 MBtu   | = | 2.61E+01 Btu/CFM-HR |
|           | 813.3 CFM   | x | 3502 HR/YR    |   |                     |
| COAUHC    | 176,387.3 kWH   | - | 175,209.5 kWH | = | 2.57E-04 kWH/CFM-HR |
|           | 813.3 CFM   | x | 5631 HR/YR    |   |                     |
| COAUC     | 176,387.3 kWH   | - | 175,209.5 kWH | = | 6.80E-04 kWH/CFM-HR |
|           | 813.3 CFM   | x | 2129 HR/YR    |   |                     |
| HOAOHC    | 545.61 MBtu   | - | 460.9 MBtu    | = | 3.33E+01 Btu/CFM-HR |
|           | 813.3 CFM   | x | 3129 HR/YR    |   |                     |
| HOAOH     | 545.61 MBtu   | - | 460.9 MBtu    | = | 5.35E+01 Btu/CFM-HR |
|           | 813.3 CFM   | x | 1946 HR/YR    |   |                     |
| COAOHC    | 176,387.3 kWH   | - | 173,454.4 kWH | = | 1.15E-03 kWH/CFM-HR |
|           | 813.3 CFM   | x | 3129 HR/YR    |   |                     |
| COAOC     | 176,387.3 kWH   | - | 173,454.4 kWH | = | 3.05E-03 kWH/CFM-HR |
|           | 813.3 CFM   | x | 1183 HR/YR    |   |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | = | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | = | 0.17                |
| ECC       | 133,302.1 kWH   | - | 131,280.4 kWH | = | 2.10E-04 kWH/CFM-HR |
|           | 8133 CFM  | x | 1183 HR/YR    |   |                     |
| ECHC      | 133,302.1 kWH   | - | 131,280.4 kWH | = | 7.95E-05 kWH/CFM-HR |
|           | 8133 CFM  | x | 3129 HR/YR    |   |                     |
| NSUCHC    | 176,387.3 kWH   | - | 133,302.1 kWH | = | 9.41E-04 kWH/CFM-HR |
|           | 8133 CFM  | x | 5631 HR/YR    |   |                     |
| NSUCC     | 176,387.3 kWH   | - | 133,302.1 kWH | = | 2.49E-03 kWH/CFM-HR |
|           | 8133 CFM  | x | 2129 HR/YR    |   |                     |
| DDCCHC    | 176,387.3 kWH   | - | 170,457.1 kWH | = | 2.33E-04 kWH/CFM-HR |
|           | 8133 CFM  | x | 3129 HR/YR    |   |                     |
| DDCCC     | 176,387.3 kWH   | - | 170,457.1 kWH | = | 6.16E-04 kWH/CFM-HR |
|           | 8133 CFM  | x | 1183 HR/YR    |   |                     |
| NSC       | 545.61 MBtu   | - | 427.92 MBtu   | = | 3.66E+04 Btu/UA     |
|           | 3215.433 UA   |   |               |   |                     |
| DDCH      | 545.61 MBtu   | - | 448.88 MBtu   | = | 3.01E+04 Btu/UA     |
|           | 3215.433 UA   |   |               |   |                     |
| OPT       | ( 2 HR/DAY X 240 DAY/YR )                             | - | 175 HR/YR     | = | 305 HR/YR           |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               | = | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01          | = | 5.67 HR/YR          |



INPUT LOADS ..

```

$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *
        LINE-4 *BASELINE SIMULATION FOR BLDG. #7108      *
        LINE-5 *BN ADMIN & CLRM      * ..

```

```

ABORT          ERRORS ..
DIAGNOSTIC     WARNINGS ..
LOADS-REPORT   VERIFICATION=(LV-D)
               SUMMARY=(LS-C,LS-D)
               HOURLY-DATA-SAVE = YES ..
BUILDING-LOCATION  LATITUDE = 39.0
               LONGITUDE = 96.5
               ALTITUDE = 1065.
               TIME-ZONE = 6
               GROSS-AREA = 12273
               SHIELDING-COEF = 0.29
               X-REF = 0.0
               Y-REF = 0.0 ..
RUN-PERIOD     JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

```

LD_PEOPLE  =DAY-SCHEDULE  (1,5) (0.)
               (6) (0.5)
               (7,11) (1.)
               (12) (0.5)
               (13,18) (1.)
               (19,24) (0.) ..

LD_LIT/EQU =DAY-SCHEDULE  (1,5) (0.)
               (6) (0.5)
               (7,18) (1.)
               (19,24) (0.) ..

LD_ON      =DAY-SCHEDULE  (1,24) (1.) ..

LD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..

LW_ON      =WEEK-SCHEDULE  (ALL) LD_ON ..

LW_OFF     =WEEK-SCHEDULE  (ALL) LD_OFF ..

```

LW\_PEOPLE =WEEK-SCHEDULE (WD) LD\_PEOPLE  
(WEH) LD\_OFF ..

LW\_LIT/EQU =WEEK-SCHEDULE (WD) LD\_LIT/EQU  
(WEH) LD\_OFF ..

\$ ON 100% LOADS

L\_ON =SCHEDULE THRU DEC 31 LW\_ON ..

\$ OFF 100% LOADS

L\_OFF =SCHEDULE THRU DEC 31 LW\_OFF ..

\$ PEOPLE LOAD

L\_PEOPLE =SCHEDULE THRU DEC 31 LW\_PEOPLE ..

\$ LIGHTS AND EQUIPMENT

L\_EQUI/LIG =SCHEDULE THRU DEC 31 LW\_LIT/EQU ..

# \$ CONSTRUCTION TYPES

\$ BRICK, AIR, BRICK

WALL-1 =LAYERS MATERIAL=(BK01,IN45,CB11) I-F-R= 0.6100  
THICKNESS=(0.333,0.167,0.667) ..

END-WALL =CONSTRUCTION LAYERS = WALL-1  
ABSORPTANCE = 0.880  
ROUGHNESS = 2 ..

\$ SLAB FLOOR

FLOOR =CONSTRUCTION U-VALUE = 0.020  
ABSORPTANCE = 0.610  
ROUGHNESS = 5 ..

\$ BRICK, FELT, INSL, CMU

WALL-2 =LAYERS MATERIAL=(BK01,HF-E3,HF-B6,CB11) I-F-R= 0.6100  
THICKNESS=(0.333,0.031,0.167,0.667) ..

SIDWALL1 =CONSTRUCTION LAYERS = WALL-2  
ABSORPTANCE = 0.880  
ROUGHNESS = 2 ..

\$ STANDARD METAL DOOR

DOOR-MET =CONSTRUCTION U-VALUE = 0.480  
ABSORPTANCE = 0.860  
ROUGHNESS = 5 ..

\$ FACIA, BRICK, FELT, INSL, CMU

WALL-2A =LAYERS MATERIAL=(HF-A3,AL11,BK01,HF-E3,HF-B6,CB11) I-F-R= 0.6100  
THICKNESS=(0.005,0.000,0.333,0.031,0.167,0.667) ..

SIDW/FAC =CONSTRUCTION LAYERS = WALL-2A  
ABSORPTANCE = 0.750  
ROUGHNESS = 5 ..

## \$ 1/2" DROP CEILING ACU TILE

DROP-CEL =CONSTRUCTION U-VALUE = 0.550  
 ABSORPTANCE = 0.750  
 ROUGHNESS = 2 ..

## \$ METAL ROOF, 3IN INSL

THINROOF =LAYERS MATERIAL=(HF-A3,IN75,HF-A3)  
 THICKNESS=(0.005,0.208,0.005) ..  
 ROOF-1 =CONSTRUCTION LAYERS = THINROOF  
 ABSORPTANCE = 0.800 ..

2PAN\_STD =GLASS-TYPE GLASS-TYPE-CODE = 1  
 PANES = 2 ..

## \$ SPACE DESCRIPTION

SPACE\_1 =SPACE AREA = 4445.0 VOLUME = 44450.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 300.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.39  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_EQUI/LIG  
 EQUIP-SCHEDULE = L\_EQUI/LIG EQUIPMENT-W/SQFT = 0.23  
 FURN-WEIGHT = 0.8 INF-METHOD = AIR-CHANGE  
 AIR-CHANGES/HR = 0.09 ..

E-W HEIGHT = 10.0 WIDTH = 127.0 CONS = SIDWALL1  
 AZIMUTH = 130 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.5 WIDTH = 3.3 G-T = 2PAN\_STD  
 MULTIPLIER = 9.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 30.  
 OVERHANG-D = 2.5 ..

E-W HEIGHT = 10.0 WIDTH = 36.0 CONS = END-WALL  
 AZIMUTH = 220 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 5. OVERHANG-W = 20. OVERHANG-D = 1.5  
 LEFT-FIN-H = 10. LEFT-FIN-D = 1.  
 RIGHT-FIN-H = 10. RIGHT-FIN-D = 1. ..

E-W HEIGHT = 10.0 WIDTH = 19.0 CONS = END-WALL  
 AZIMUTH = 40 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 35.0 WIDTH = 127.0 CONS = FLOOR ..



I-W HEIGHT = 35.0 WIDTH = 127.0 CONS = DROP-CEL  
NEXT-TO = PLENUM\_1 ..

SPACE\_2 =SPACE AREA = 3234.0 VOLUME = 32340.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 300.0  
PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.39  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_EQUI/LIG  
EQUIP-SCHEDULE = L\_EQUI/LIG EQUIPMENT-W/SQFT = 0.23  
FURN-WEIGHT = 0.8 INF-METHOD = AIR-CHANGE  
AIR-CHANGES/HR = 0.09 ..

E-W HEIGHT = 10.0 WIDTH = 42.0 CONS = END-WALL  
AZIMUTH = 220 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
OVERHANG-A = 5. OVERHANG-W = 20. OVERHANG-D = 1.5  
LEFT-FIN-H = 10. LEFT-FIN-D = 1.  
RIGHT-FIN-H = 10. RIGHT-FIN-D = 1. ..

E-W HEIGHT = 10.0 WIDTH = 77.0 CONS = SIDWALL1  
AZIMUTH = 310 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.5 WIDTH = 3.3 G-T = 2PAN\_STD  
MULTIPLIER = 5.0 SETBACK = 0.5  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
OVERHANG-A = 10. OVERHANG-W = 30.  
OVERHANG-D = 2.5 ..

U-W HEIGHT = 42.0 WIDTH = 77.0 CONS = FLOOR ..

I-W HEIGHT = 42.0 WIDTH = 77.0 CONS = DROP-CEL  
NEXT-TO = PLENUM\_1 ..

SPACE\_3 =SPACE AREA = 3576.0 VOLUME = 35760.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 300.0  
PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.39  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_EQUI/LIG  
EQUIP-SCHEDULE = L\_EQUI/LIG EQUIPMENT-W/SQFT = 0.23  
FURN-WEIGHT = 0.8 INF-METHOD = AIR-CHANGE  
AIR-CHANGES/HR = 0.09 ..

E-W HEIGHT = 10.0 WIDTH = 91.0 CONS = SIDWALL1  
AZIMUTH = 310 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
MULTIPLIER = 4.0 SKY-FORM-FACTOR = 0.5

GND-FORM-FACTOR = 0.5 OVERHANG-A = 5.  
 OVERHANG-W = 20. OVERHANG-D = 1.5  
 LEFT-FIN-H = 10. LEFT-FIN-D = 1.  
 RIGHT-FIN-H = 10. RIGHT-FIN-D = 1. ..

WINDOW HEIGHT = 4.5 WIDTH = 3.3 G-T = 2PAN\_STD  
 MULTIPLIER = 2.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-W = 30.  
 OVERHANG-D = 2.5 ..

E-W HEIGHT = 10.0 WIDTH = 36.0 CONS = END-WALL  
 AZIMUTH = 40 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 59.5 WIDTH = 60.0 CONS = FLOOR ..

I-W HEIGHT = 59.5 WIDTH = 60.0 CONS = DROP-CEL  
 NEXT-TO = PLENUM\_1 ..

SPACE\_4 =SPACE AREA = 924.0 VOLUME = 9240.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 300.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.39  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_EQUI/LIG  
 EQUIP-SCHEDULE = L\_EQUI/LIG EQUIPMENT-W/SQFT = 0.23  
 FURN-WEIGHT = 0.8 INF-METHOD = AIR-CHANGE  
 AIR-CHANGES/HR = 0.09 ..

E-W HEIGHT = 10.0 WIDTH = 22.0 CONS = END-WALL  
 AZIMUTH = 40 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 10.0 WIDTH = 42.0 CONS = SIDWALL1  
 AZIMUTH = 130 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
 MULTIPLIER = 2.0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 OVERHANG-A = 5.  
 OVERHANG-W = 20. OVERHANG-D = 1.5  
 LEFT-FIN-H = 10. LEFT-FIN-D = 1.  
 RIGHT-FIN-H = 10. RIGHT-FIN-D = 1. ..

U-W HEIGHT = 22.0 WIDTH = 42.0 CONS = FLOOR ..

I-W HEIGHT = 22.0 WIDTH = 42.0 CONS = DROP-CEL  
 NEXT-TO = PLENUM\_1 ..

PLENUM\_1 =SPACE AREA = 12179.0 VOLUME = 66984.5  
 TEMPERATURE = (73.) ZONE-TYPE = PLENUM  
 EQUIP-SENSIBLE = 0.0 SOURCE-SENSIBLE = 0.0  
 FLOOR-WEIGHT = 1. ..

```

E-W      HEIGHT = 5.5  WIDTH = 168.0  CONS = SIDW/FAC
        AZIMUTH = 130  SKY-FORM-FACTOR = 0.5
        GND-FORM-FACTOR = 0.5  ..

E-W      HEIGHT = 5.5  WIDTH = 168.0  CONS = SIDW/FAC
        AZIMUTH = 310  SKY-FORM-FACTOR = 0.5
        GND-FORM-FACTOR = 0.5  ..

E-W      HEIGHT = 5.5  WIDTH = 78.0  CONS = SIDW/FAC
        AZIMUTH = 220  SKY-FORM-FACTOR = 0.5
        GND-FORM-FACTOR = 0.5  ..

E-W      HEIGHT = 5.5  WIDTH = 78.0  CONS = SIDW/FAC
        AZIMUTH = 40   SKY-FORM-FACTOR = 0.5
        GND-FORM-FACTOR = 0.5  ..

ROOF     HEIGHT = 78.0  WIDTH = 220.0  CONS = ROOF-1
        TILT = 0   SKY-FORM-FACTOR = 1.0  ..

```

## \$ HOURLY REPORT DESCRIPTION

```

OUTDOOR-BK =REPORT-BLOCK VARIABLE-TYPE = GLOBAL
            VARIABLE-LIST = (3,4) ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

```

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BLDG. #7108      *
        LINE-5 *BN ADMIN & CLRM      * ..

ABORT      ERRORS ..

DIAGNOSTIC      WARNINGS ..

SYSTEMS-REPORT      VERIFICATION=(SV-A)
                    SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                    HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
SD_WT_HT   =DAY-SCHEDULE (1,24) (74.) ..
SD_SM_CL   =DAY-SCHEDULE (1,24) (72.) ..

```

```

SD_10%_OA  =DAY-SCHEDULE (1,24) (0.1) ..
SD_WT_CL   =DAY-SCHEDULE (1,24) (74.2) ..
SD_SM_HT   =DAY-SCHEDULE (1,24) (71.8) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..

SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT   =WEEK-SCHEDULE (ALL) SD_WT_HT ..

SW_SM_CL   =WEEK-SCHEDULE (ALL) SD_SM_CL ..

SW_10%_OA  =WEEK-SCHEDULE (ALL) SD_10%_OA ..

SW_WT_CL   =WEEK-SCHEDULE (ALL) SD_WT_CL ..

SW_SM_HT   =WEEK-SCHEDULE (ALL) SD_SM_HT ..

```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..
```

## \$ HEATING SEASON

```

S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON ..

```

## \$ COOLING SEASON

```

S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF ..

```

## \$ HEATING TEMP

```

S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
              THRU OCT  1 SW_SM_HT
              THRU DEC 31 SW_WT_HT ..

```

## \$ COOLING TEMP

```

S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
              THRU OCT  1 SW_SM_CL
              THRU DEC 31 SW_WT_CL ..

```

## \$ 10% OA 100% OF THE TIME

```
S_OA@10%  =SCHEDULE THRU DEC 31 SW_10%_OA ..
```

```

HRLY-SCHED =SCHEDULE THRU JAN 12 SW_OFF
              THRU JAN 13 SW_ON
              THRU AUG 15 SW_OFF
              THRU AUG 16 SW_ON
              THRU DEC 31 SW_OFF ..

```

## \$ ZONE DESCRIPTION

```

SPACE_1  =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
              HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
              ZONE-TYPE = CONDITIONED
              THERMOSTAT-TYPE = PROPORTIONAL  THROTTLING-RANGE = 0.2
              SIZING-OPTION = FROM-LOADS  ..

SPACE_2  =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
              HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
              ZONE-TYPE = CONDITIONED
              THERMOSTAT-TYPE = PROPORTIONAL  THROTTLING-RANGE = 0.2
              SIZING-OPTION = FROM-LOADS  ...

SPACE_3  =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
              HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
              ZONE-TYPE = CONDITIONED
              THERMOSTAT-TYPE = PROPORTIONAL  THROTTLING-RANGE = 0.2
              SIZING-OPTION = FROM-LOADS  ..

SPACE_4  =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
              HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
              ZONE-TYPE = CONDITIONED
              THERMOSTAT-TYPE = PROPORTIONAL  THROTTLING-RANGE = 0.2
              SIZING-OPTION = FROM-LOADS  ..

PLENUM_1  =ZONE  DESIGN-HEAT-T = 72.0  DESIGN-COOL-T = 74.0
              ZONE-TYPE = PLENUM  THROTTLING-RANGE = 0.2
              SIZING-OPTION = FROM-LOADS  ..

```

## \$ SYSTEM DESCRIPTION

```

MZ-FAN-SYS =SYSTEM  SYSTEM-TYPE = MZS
                  MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
                  HEATING-SCHEDULE = S_HE-SCHED
                  COOLING-SCHEDULE = S_CL_SCHED  PREHEAT-T = 0.0
                  OA-CONTROL = FIXED  SUPPLY-CFM = 7820.
                  RATED-CFM = 7820.  MIN-OUTSIDE-AIR = 0.1
                  MIN-AIR-SCH = S_OA@10%  SUPPLY-DELTA-T = 2.7
                  SUPPLY-KW = 0.00088
                  MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
                  NIGHT-CYCLE-CTRL = STAY-OFF  RETURN-STATIC = 0.7
                  RETURN-EFF = 0.77  NIGHT-VENT-DT = 0.0
                  MIN-CFM-RATIO = 1.0  COOLING-CAPACITY = 248100.
                  COOL-SH-CAP = 198484.  HEATING-CAPACITY = -299800.
                  RETURN-AIR-PATH = PLENUM-ZONES
                  ZONE-NAMES = (SPACE_1, SPACE_2, SPACE_3, SPACE_4,
                                PLENUM_1)
                  PLENUM-NAMES = (PLENUM_1)  ..

```

## \$ HOURLY REPORT DESCRIPTION

```

AHU-BLOCK  =REPORT-BLOCK VARIABLE-TYPE = MZ-FAN-SYS
                  VARIABLE-LIST = (3,5,6,17,18,19) ..

```

```

ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = .SPACE_3
                VARIABLE-LIST = (17,18,7,6) ..
HRLY-AHU      = HOURLY-REPORT  REPORT-SCHEDULE = HRLY-SCHED
                REPORT-BLOCK = (AHU-BLOCK)

..
HRLY-ZONE     = HOURLY-REPORT  REPORT-SCHEDULE = HRLY-SCHED
                REPORT-BLOCK = (ZONE-BLOCK)

..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BLDG. #7108      *
        LINE-5 *BN ADMIN & CLRM      * ..

```

```

ABORT          ERRORS ..
DIAGNOSTIC     WARNINGS ..
PLANT-REPORT   VERIFICATION=(PV-A)
                SUMMARY=(PS-B,BEPS)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON          =DAY-SCHEDULE (1,24) (1.) ..

PD_OFF         =DAY-SCHEDULE (1,24) (0.) ..

PW_OFF        =WEEK-SCHEDULE (ALL) PD_OFF ..

PW_ON         =WEEK-SCHEDULE (ALL) PD_ON ..

```

## \$ HEATING SEASON

```

P_HEAT        =SCHEDULE THRU MAY 15 PW_ON
                THRU OCT 1 PW_OFF
                THRU DEC 31 PW_ON ..

```

## \$ COOLING SEASON

```

P_COOL        =SCHEDULE THRU MAY 15 PW_OFF
                THRU OCT 1 PW_ON
                THRU DEC 31 PW_OFF ..

```

## \$ EQUIPMENT DESCRIPTION

HW-PLANT =PLANT-EQUIPMENT TYPE = HW-BOILER  
SIZE = -999. ..

COOL-PLANT =PLANT-EQUIPMENT TYPE = HERM-REC-CHLR  
SIZE = -999. INSTALLED-NUMBER = 2  
MAX-NUMBER-AVAIL = 2 ..

PLANT-PARAMETERS BOILER-FUEL = NATURAL-GAS HERM-REC-COND-TYPE = AIR  
CCIRC-HEAD = 70.0 HCIRC-HEAD = 70.0 ..

ENERGY-RESOURCE RESOURCE = ELECTRICITY ..

ENERGY-RESOURCE RESOURCE = NATURAL-GAS ..

HEAT =LOAD-ASSIGNMENT TYPE = HEATING  
OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = HW-PLANT  
NUMBER = 1 ..

COOL =LOAD-ASSIGNMENT TYPE = COOLING  
OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = COOL-PLANT  
NUMBER = 2 ..

END ..  
COMPUTE PLANT ..  
STOP ..





EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 14:32:41 LDD RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS

\*\*\* BUILDING \*\*\*

FLOOR AREA 12179 SQFT 1131 SQMT  
 VOLUME 188775 CUFT 5346 CUMT

HEATING LOAD  
 =====  
 JAN 16 6AM  
 10F -12C  
 8F -13C

COOLING LOAD  
 =====  
 AUG 24 6PM  
 93F 34C  
 76F 24C

TIME  
 DRY-BULB TEMP  
 WET-BULB TEMP

|                      | SENSIBLE<br>(KBTU/H) ( KW ) |            | LATENT<br>(KBTU/H) ( KW ) |         | SENSIBLE<br>(KBTU/H) ( KW ) |            |
|----------------------|-----------------------------|------------|---------------------------|---------|-----------------------------|------------|
| WALLS                | 5.905                       | 1.729      | 0.000                     | 0.000   | -28.955                     | -8.480     |
| ROOFS                | 0.000                       | 0.000      | 0.000                     | 0.000   | 0.000                       | 0.000      |
| GLASS CONDUCTION     | 2.382                       | 0.698      | 0.000                     | 0.000   | -8.267                      | -2.421     |
| GLASS SOLAR          | 6.870                       | 2.012      | 0.000                     | 0.000   | 0.609                       | 0.178      |
| DOOR                 | 2.310                       | 0.677      | 0.000                     | 0.000   | -6.229                      | -1.824     |
| INTERNAL SURFACES    | 0.000                       | 0.000      | 0.000                     | 0.000   | 0.000                       | 0.000      |
| UNDERGROUND SURFACES | -1.152                      | -0.337     | 0.000                     | 0.000   | -6.990                      | -2.047     |
| OCCUPANTS TO SPACE   | 14.248                      | 4.173      | 25.373                    | 7.431   | 0.031                       | 0.009      |
| LIGHT TO SPACE       | 53.232                      | 15.590     | 0.000                     | 0.000   | 0.177                       | 0.052      |
| EQUIPMENT TO SPACE   | 9.050                       | 2.650      | 0.000                     | 0.000   | 0.020                       | 0.006      |
| PROCESS TO SPACE     | 0.000                       | 0.000      | 0.000                     | 0.000   | 0.000                       | 0.000      |
| INFILTRATION         | 7.706                       | 2.257      | 11.955                    | 3.501   | -19.339                     | -5.664     |
| TOTAL                | 100.551                     | 29.449     | 37.328                    | 10.933  | -68.942                     | -20.191    |
| TOTAL LOAD           | 137.880                     | KBTU/H     | 40.382                    | KW      | -68.942                     | KBTU/H     |
| TOTAL LOAD / AREA    | 11.32                       | BTU/H.SQFT | 35.690                    | W /SQMT | 5.66                        | BTU/H.SQFT |
|                      |                             |            |                           |         |                             | W /SQMT    |

\*\*\*\*\*  
 \*  
 \* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR \*  
 \* --- LOADS \*  
 \* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION \*  
 \* IN CONSIDERATION \*  
 \*\*\*\*\*

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 14:32:41 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-FAN-SYS TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -95.137                     | 15                      | -6. F                | -7. F                | -273.478                                | 10918.                             | 27.438                          |
| FEB   | 0.00000                     |                         |                      |                      | -69.797                     | 3                       | -1. F                | -2. F                | -240.197                                | 9869.                              | 27.438                          |
| MAR   | 0.00000                     |                         |                      |                      | -50.681                     | 3                       | 15. F                | 13. F                | -193.289                                | 11411.                             | 27.438                          |
| APR   | 0.00000                     |                         |                      |                      | -13.714                     | 5                       | 31. F                | 29. F                | -129.702                                | 10732.                             | 27.438                          |
| MAY   | 30.68973                    | 31 18                   | 90. F                | 76. F                | -2.152                      | 9                       | 45. F                | 44. F                | -79.934                                 | 10918.                             | 27.438                          |
| JUN   | 76.41174                    | 29 15                   | 88. F                | 75. F                | 0.000                       |                         |                      |                      | 0.000                                   | 10979.                             | 27.438                          |
| JUL   | 94.50362                    | 7 18                    | 83. F                | 74. F                | 0.000                       |                         |                      |                      | 0.000                                   | 10671.                             | 27.438                          |
| AUG   | 96.42191                    | 4 17                    | 92. F                | 70. F                | 0.000                       |                         |                      |                      | 0.000                                   | 11411.                             | 27.438                          |
| SEP   | 48.79247                    | 7 15                    | 92. F                | 76. F                | 0.000                       |                         |                      |                      | 0.000                                   | 10732.                             | 27.438                          |
| OCT   | 0.17299                     | 1 18                    | 83. F                | 68. F                | -11.298                     | 20                      | 25. F                | 25. F                | -140.569                                | 10671.                             | 27.438                          |
| NOV   | 0.00000                     |                         |                      |                      | -42.580                     | 3                       | 13. F                | 12. F                | -186.719                                | 10486.                             | 27.438                          |
| DEC   | 0.00000                     |                         |                      |                      | -84.120                     | 15                      | 8. F                 | 7. F                 | -233.355                                | 10918.                             | 27.438                          |
| TOTAL | 346.993                     |                         |                      |                      | -369.476                    |                         |                      |                      | -273.478                                | 129722.                            | 27.438                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 14:32:41 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-FAN-SYS TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |                            |                   |                            |                            |                     |                           |                           |                                      | C O I N C I D E N T L O A D S                      |  |
|--------|---------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|---------------------|---------------------------|---------------------------|--------------------------------------|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 744                 | 0                         | 0                         | 0                                    | -117.027   | 7.716  |
| FEB    | 0                         | 672                      | 0                          | 0                 | 672                        | 0                          | 672                 | 0                         | 0                         | 0                                    | -119.979   | 7.716  |
| MAR    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 744                 | 0                         | 0                         | 0                                    | -116.748   | 7.716  |
| APR    | 0                         | 720                      | 0                          | 0                 | 720                        | 0                          | 720                 | 0                         | 0                         | 0                                    | -0.036   | 7.716  |
| MAY    | 311                       | 360                      | 0                          | 73                | 384                        | 384                        | 744                 | 0                         | 0                         | 73                                   | 0.000  | 27.438   |
| JUN    | 664                       | 0                        | 0                          | 56                | 720                        | 720                        | 720                 | 0                         | 0                         | 56                                   | 0.000  | 27.438   |
| JUL    | 736                       | 0                        | 0                          | 8                 | 744                        | 744                        | 744                 | 0                         | 0                         | 8                                    | 0.000  | 27.438   |
| AUG    | 727                       | 0                        | 0                          | 17                | 744                        | 744                        | 744                 | 0                         | 0                         | 17                                   | 0.000  | 27.438   |
| SEP    | 491                       | 0                        | 0                          | 229               | 720                        | 720                        | 744                 | 0                         | 0                         | 229                                  | 0.000  | 27.438   |
| OCT    | 6                         | 720                      | 0                          | 18                | 720                        | 24                         | 744                 | 0                         | 0                         | 18                                   | 0.000  | 7.716  |
| NOV    | 0                         | 720                      | 0                          | 0                 | 720                        | 0                          | 720                 | 0                         | 0                         | 0                                    | -140.023   | 7.716  |
| DEC    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 744                 | 0                         | 0                         | 0                                    | -156.261   | 7.716  |
| ANNUAL | 2935                      | 5424                     | 0                          | 401               | 5424                       | 3336                       | 8760                | 0                         | 0                         | 401                                  |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 14:32:41 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL(MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>42.281<br>100.921<br>31/10 | NATURAL-GAS<br>133.874<br>343.935<br>15/ 8 |
|-----|---|---|--|
| JAN | TOTAL(MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.281<br>100.921<br>31/10                | 133.874<br>343.935<br>15/ 8                |
| FEB | TOTAL(MBTU)<br>PEAK (KBTU)<br>DY/HR             | 38.039<br>100.921<br>28/10                | 101.619<br>308.672<br>3/ 5                 |
| MAR | TOTAL(MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.820<br>100.921<br>31/ 9                | 76.464<br>257.615<br>3/ 5                  |
| APR | TOTAL(MBTU)<br>PEAK (KBTU)<br>DY/HR             | 38.610<br>100.921<br>15/ 8                | 23.349<br>185.869<br>5/ 5                  |
| MAY | TOTAL(MBTU)<br>PEAK (KBTU)<br>DY/HR             | 49.771<br>189.118<br>31/18                | 4.490<br>127.682<br>9/ 5                   |
| JUN | TOTAL(MBTU)<br>PEAK (KBTU)<br>DY/HR             | 66.518<br>188.307<br>28/16                | 0.000<br>0.000<br>30/ 1                    |
| JUL | TOTAL(MBTU)<br>PEAK (KBTU)<br>DY/HR             | 72.114<br>193.603<br>22/16                | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL(MBTU)<br>PEAK (KBTU)<br>DY/HR             | 76.150<br>199.465<br>11/16                | 0.000<br>0.000<br>31/ 1                    |
| SEP | TOTAL(MBTU)<br>PEAK (KBTU)<br>DY/HR             | 55.884<br>189.212<br>7/16                 | 0.000<br>0.000<br>30/ 1                    |
| OCT | TOTAL(MBTU)<br>PEAK (KBTU)<br>DY/HR             | 38.403<br>100.921<br>20/10                | 19.871<br>198.337<br>20/ 5                 |
| NOV | TOTAL(MBTU)<br>PEAK (KBTU)<br>DY/HR             | 39.237<br>100.921<br>30/11                | 64.890<br>250.336<br>3/ 5                  |
| DEC | TOTAL(MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.209<br>100.921<br>30/18                | 121.051<br>301.323<br>15/ 5                |
|     | ONE YEAR<br>USE/PEAK                            | 602.036<br>199.465                        | 545.608<br>343.935                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 14:32:41 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 19.62       | 545.61      |
| SPACE COOL      | 121.65      | 0.00        |
| HVAC AUX        | 248.63      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 182.00      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 30.11       | 0.00        |
| TOTAL           | 602.01      | 545.61      |

TOTAL SITE ENERGY 1147.64 MBTU 93.5 KBTU/SQFT-YR GROSS-AREA 94.2 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2353.52 MBTU 191.8 KBTU/SQFT-YR GROSS-AREA 193.2 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 4.3  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



```

E-W      HEIGHT = 5.5  WIDTH = 168.0  CONS = SIDW/FAC
        AZIMUTH = 130  SKY-FORM-FACTOR = 0.5
        GND-FORM-FACTOR = 0.5  ..

E-W      HEIGHT = 5.5  WIDTH = 168.0  CONS = SIDW/FAC
        AZIMUTH = 310  SKY-FORM-FACTOR = 0.5
        GND-FORM-FACTOR = 0.5  ..

E-W      HEIGHT = 5.5  WIDTH = 78.0  CONS = SIDW/FAC
        AZIMUTH = 220  SKY-FORM-FACTOR = 0.5
        GND-FORM-FACTOR = 0.5  ..

E-W      HEIGHT = 5.5  WIDTH = 78.0  CONS = SIDW/FAC
        AZIMUTH = 40   SKY-FORM-FACTOR = 0.5
        GND-FORM-FACTOR = 0.5  ..

ROOF     HEIGHT = 78.0  WIDTH = 220.0  CONS = ROOF-1
        TILT = 0   SKY-FORM-FACTOR = 1.0  ..

```

## \$ HOURLY REPORT DESCRIPTION

```

OUTDOOR-BK =REPORT-BLOCK VARIABLE-TYPE = GLOBAL
          VARIABLE-LIST = (3,4) ..

```

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #1 NIGHT SET BACK FOR BLDG. #7108 *
        LINE-5 *BN ADMIN & CLRM      * ..

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                  SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                  HOURLY-DATA-SAVE = YES ..

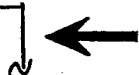
```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
SD_WT_HT   =DAY-SCHEDULE (1,5) (55.)
                  (6,18) (74.)

```



```

(19,24) (55.) ..
SD_SM_CL =DAY-SCHEDULE (1,5) (85.)
(6,18) (72.)
(19,24) (85.) ..
SD_10%_OA =DAY-SCHEDULE (1,24) (0.1) ..
SD_WT_CL =DAY-SCHEDULE (1,5) (55.2)
(6,18) (74.2)
(19,24) (55.2) ..
SD_SM_HT =DAY-SCHEDULE (1,5) (84.8)
(6,18) (71.8)
(19,24) (84.8) ..
SD_FAN_CYC =DAY-SCHEDULE (1,5) (-1.)
(6,18) (1.)
(19,24) (-1.) ..

SW_ON =WEEK-SCHEDULE (ALL) SD_ON ..

SW_OFF =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT =WEEK-SCHEDULE (ALL) SD_WT_HT ..

SW_SM_CL =WEEK-SCHEDULE (ALL) SD_SM_CL ..

SW_10%_OA =WEEK-SCHEDULE (ALL) SD_10%_OA ..

SW_WT_CL =WEEK-SCHEDULE (ALL) SD_WT_CL ..

SW_SM_HT =WEEK-SCHEDULE (ALL) SD_SM_HT ..

SW_FAN_CYC =WEEK-SCHEDULE (ALL) SD_FAN_CYC ..

$ FULL ON SYSTEM
S_ON =SCHEDULE THRU DEC 31 SW_ON ..

$ FULL OFF SYSTEM
S_OFF =SCHEDULE THRU DEC 31 SW_OFF ..

$ HEATING SEASON
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
THRU OCT 1 SW_OFF
THRU DEC 31 SW_ON ..

$ COOLING SEASON
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
THRU OCT 1 SW_ON
THRU DEC 31 SW_OFF ..

$ HEATING TEMP
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
THRU OCT 1 SW_SM_HT
THRU DEC 31 SW_WT_HT ..

$ COOLING TEMP
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
THRU OCT 1 SW_SM_CL

```

THRU DEC 31 SW\_WT\_CL ..

\$ 10% OA 100% OF THE TIME

S\_OA@10% =SCHEDULE THRU DEC 31 SW\_10%\_OA ..

HRLY-SCHED =SCHEDULE THRU JAN 30 SW\_OFF

THRU JAN 31 SW\_ON

THRU AUG 10 SW\_OFF

THRU AUG 11 SW\_ON

THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

## \$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_4 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

PLENUM\_1 =ZONE DESIGN-HEAT-T = 72.0 DESIGN-COOL-T = 74.0  
 ZONE-TYPE = PLENUM THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ-FAN-SYS =SYSTEM SYSTEM-TYPE = MZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 HEAT-CONTROL = COLDEST COOL-CONTROL = WARMEST  
 OA-CONTROL = FIXED SUPPLY-CFM = 7820.  
 RATED-CFM = 7820. MIN-OUTSIDE-AIR = 0.1  
 MIN-AIR-SCH = S\_OA@10% MAX-OA-FRACTION = 0.1



```

FAN-SCHEDULE = S_FAN_CYC  SUPPLY-DELTA-T = 2.7
SUPPLY-KW = 0.00088
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  RETURN-STATIC = 0.7
RETURN-EFF = 0.77  NIGHT-VENT-DT = 0.0
MIN-CFM-RATIO = 1.0  COOLING-CAPACITY = 248100.
COOL-SH-CAP = 198484.  HEATING-CAPACITY = -299800.
RETURN-AIR-PATH = PLENUM-ZONES
ZONE-NAMES = (SPACE_1, SPACE_2, SPACE_3, SPACE_4,
              PLENUM_1)
PLENUM-NAMES = (PLENUM_1) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

AHU-BLOCK  =REPORT-BLOCK VARIABLE-TYPE = MZ-FAN-SYS
              VARIABLE-LIST = (3,5,6,17,18,19,23,39) ..
ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = SPACE_3
              VARIABLE-LIST = (17,18,7,6) ..
HRLY-AHU   = HOURLY-REPORT  REPORT-SCHEDULE = HRLY-SCHED
              REPORT-BLOCK = (AHU-BLOCK)
..
HRLY-ZONE  = HOURLY-REPORT  REPORT-SCHEDULE = HRLY-SCHED
              REPORT-BLOCK = (ZONE-BLOCK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #1 NIGHT SET BACK FOR BLDG. #7108  *
        LINE-5 *BN ADMIN & CLRM                        * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC WARNINGS ..
PLANT-REPORT VERIFICATION=(PV-A)
              SUMMARY=(PS-B,BEPS)
              HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON      =DAY-SCHEDULE (1,24) (1.) ..
PD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

```

| EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8: 7:52 SDL RUN 1 |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
|---|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 RUN #1 NIGHT SET BACK FOR BLDG. #7108 BN ADMIN & CLRM                              |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-FAN-SYS TOPEKA, KS                                 |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----   |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
| MONTH   | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -76.286                     | 15                      | 7                    | -8. F                | -357.783                                | 8286.                              | 27.438                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -56.537                     | 3                       | 7                    | -5. F                | -349.900                                | 7493.                              | 27.438                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -40.338                     | 4                       | 7                    | 14. F                | -337.881                                | 8780.                              | 27.438                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -12.067                     | 5                       | 6                    | 31. F                | -313.756                                | 8186.                              | 27.438                          |
| MAY   | 24.82872                    | 31 18                   | 90. F                | 76. F                | 279.010                                 | -2.234                      | 9                       | 6                    | 44. F                | -177.382                                | 8288.                              | 28.486                          |
| JUN   | 61.75295                    | 29 15                   | 88. F                | 75. F                | 281.268                                 | 0.000                       |                         |                      |                      | 0.000                                   | 8433.                              | 27.438                          |
| JUL   | 75.18604                    | 7 18                    | 83. F                | 74. F                | 304.253                                 | 0.000                       |                         |                      |                      | 0.000                                   | 8040.                              | 27.438                          |
| AUG   | 77.02224                    | 4 17                    | 92. F                | 70. F                | 294.195                                 | 0.000                       |                         |                      |                      | 0.000                                   | 8780.                              | 27.438                          |
| SEP   | 39.93212                    | 7 16                    | 93. F                | 76. F                | 268.403                                 | 0.000                       |                         |                      |                      | 0.000                                   | 8188.                              | 27.438                          |
| OCT   | 0.11945                     | 1 18                    | 83. F                | 68. F                | 42.766                                  | -9.572                      | 20                      | 6                    | 24. F                | -316.584                                | 8040.                              | 27.438                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -34.039                     | 3                       | 7                    | 19. F                | -337.925                                | 7940.                              | 27.438                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -68.145                     | 15                      | 7                    | 11. F                | -344.684                                | 8286.                              | 27.438                          |
| TOTAL   | 278.841                     |                         |                      |                      | ---                                     | -299.217                    |                         |                      |                      | ---                                     | 98739.                             | ---                             |
| MAX   |                             |                         |                      |                      | 304.253                                 |                             |                         |                      |                      | -357.783                                |                                    | 28.486                          |

| EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8: 7:52 SDL RUN |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
|--|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #1 NIGHT SET BACK FOR BLDG. #7108 BN ADMIN & CLRM                       |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-FAN-SYS TOPEKA, KS                             |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----  |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN  | 0                        | 403                      | 0  | 341               | 744                        | 0                          | 403                          | 0                         | 0                                    | 0.000  | 0.000  |
| FEB  | 0                        | 363                      | 0  | 309               | 672                        | 0                          | 364                          | 0                         | 1                                    | 0.000  | 0.000  |
| MAR  | 0                        | 390                      | 0  | 354               | 744                        | 0                          | 403                          | 0                         | 13                                   | 0.000  | 0.000  |
| APR  | 0                        | 322                      | 0  | 398               | 720                        | 0                          | 390                          | 0                         | 68                                   | 0.000  | 0.000  |
| MAY  | 187                      | 138                      | 0  | 419               | 360                        | 384                        | 403                          | 0                         | 78                                   | 0.000  | 27.438   |
| JUN  | 375                      | 0                        | 0  | 345               | 0                          | 720                        | 390                          | 0                         | 15                                   | 0.000  | 0.000  |
| JUL  | 403                      | 0                        | 0  | 341               | 0                          | 744                        | 403                          | 0                         | 0                                    | 0.000  | 27.438   |
| AUG  | 403                      | 0                        | 0  | 341               | 0                          | 744                        | 403                          | 0                         | 0                                    | 0.000  | 27.438   |
| SEP  | 293                      | 0                        | 0  | 427               | 0                          | 720                        | 390                          | 0                         | 97                                   | 0.000  | 27.438   |
| OCT  | 4                        | 314                      | 0  | 426               | 24                         | 24                         | 403                          | 0                         | 85                                   | 0.000  | 7.716  |
| NOV  | 0                        | 356                      | 0  | 364               | 720                        | 0                          | 390                          | 0                         | 34                                   | 0.000  | 0.000  |
| DEC  | 0                        | 403                      | 0  | 341               | 744                        | 0                          | 403                          | 0                         | 0                                    | 0.000  | 0.000  |
| ANNUAL   | 1665                     | 2689                     | 0  | 4406              | 5424                       | 3336                       | 4745                         | 0                         | 391                                  |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8: 7:52 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SET BACK FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>31.871<br>103.151<br>31/12 | NATURAL-GAS<br>104.869<br>449.959<br>15/ 7 |
|-----|--|---|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 28.671<br>103.151<br>28/12                | 79.861<br>441.685<br>3/ 7                  |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 32.618<br>103.151<br>31/11                | 58.621<br>429.002<br>4/ 7                  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 29.279<br>103.151<br>15/ 9                | 19.292<br>403.304<br>5/ 6                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.682<br>189.750<br>31/18                | 4.096<br>252.012<br>9/ 6                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 50.509<br>189.762<br>28/16                | 0.000<br>0.000<br>30/ 1                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 53.984<br>195.191<br>22/16                | 0.000<br>0.000<br>31/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 57.683<br>201.143<br>11/16                | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.634<br>190.640<br>7/16                 | 0.000<br>0.000<br>30/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 28.771<br>103.151<br>31/ 9                | 15.942<br>406.334<br>20/ 6                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 29.479<br>103.151<br>30/13                | 50.081<br>429.048<br>3/ 7                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 31.778<br>103.151<br>30/18                | 95.154<br>436.190<br>15/ 7                 |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |   |  |
|     | ONE YEAR<br>USE/PEAK                             | 454.958<br>201.143                        | 427.917<br>449.959                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8: 7:52 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SET BACK FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 13.99       | 427.92      |
| SPACE COOL      | 93.10       | 0.00        |
| HVAC AUX        | 135.76      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 182.00      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 30.11       | 0.00        |
| TOTAL           | 454.96      | 427.92      |

TOTAL SITE ENERGY 882.87 MBTU 71.9 KBTU/SQFT-YR GROSS-AREA 72.5 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1794.16 MBTU 146.2 KBTU/SQFT-YR GROSS-AREA 147.3 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 9.3  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



E-W HEIGHT = 5.5 WIDTH = 168.0 CONS = SIDW/FAC  
 AZIMUTH = 130 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 5.5 WIDTH = 168.0 CONS = SIDW/FAC  
 AZIMUTH = 310 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 5.5 WIDTH = 78.0 CONS = SIDW/FAC  
 AZIMUTH = 220 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 5.5 WIDTH = 78.0 CONS = SIDW/FAC  
 AZIMUTH = 40 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 78.0 WIDTH = 220.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

## \$ HOURLY REPORT DESCRIPTION

OUTDOOR-BK =REPORT-BLOCK VARIABLE-TYPE = GLOBAL  
 VARIABLE-LIST = (3,4) ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #2 DDC CONTROL FOR BLDG. #7108 \*  
 LINE-5 \*BN ADMIN & CLRM \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,24) (70.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,24) (76.) ..

```
SD_10%_OA  =DAY-SCHEDULE (1,24) (0.1) ..
SD_WT_CL   =DAY-SCHEDULE (1,24) (70.2) ..
SD_SM_HT   =DAY-SCHEDULE (1,24) (75.8) ..
```

```
SW_ON      =WEEK-SCHEDULE (ALL) SD_ON  ..
```

```
SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..
```

```
SW_WT_HT   =WEEK-SCHEDULE (ALL) SD_WT_HT ..
```

```
SW_SM_CL   =WEEK-SCHEDULE (ALL) SD_SM_CL ..
```

```
SW_10%_OA  =WEEK-SCHEDULE (ALL) SD_10%_OA ..
```

```
SW_WT_CL   =WEEK-SCHEDULE (ALL) SD_WT_CL ..
```

```
SW_SM_HT   =WEEK-SCHEDULE (ALL) SD_SM_HT ..
```

## \$ FULL ON SYSTEM

```
S_ON       =SCHEDULE THRU DEC 31 SW_ON  ..
```

## \$ FULL OFF SYSTEM

```
S_OFF      =SCHEDULE THRU DEC 31 SW_OFF ..
```

## \$ HEATING SEASON

```
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON  ..
```

## \$ COOLING SEASON

```
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF ..
```

## \$ HEATING TEMP

```
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
              THRU OCT  1 SW_SM_HT
              THRU DEC 31 SW_WT_HT ..
```

## \$ COOLING TEMP

```
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
              THRU OCT  1 SW_SM_CL
              THRU DEC 31 SW_WT_CL ..
```

## \$ 10% OA 100% OF THE TIME

```
S_OA@10%   =SCHEDULE THRU DEC 31 SW_10%_OA ..
```

```
HRLY-SCHED =SCHEDULE THRU JAN 12 SW_OFF
```

```
              THRU JAN 13 SW_ON
```

```
              THRU AUG 15 SW_OFF
```

```
              THRU AUG 16 SW_ON
```

```
              THRU DEC 31 SW_OFF ..
```

## \$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_4 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

PLENUM\_1 =ZONE DESIGN-HEAT-T = 72.0 DESIGN-COOL-T = 74.0  
 ZONE-TYPE = PLENUM THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ-FAN-SYS =SYSTEM SYSTEM-TYPE = MZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 HEAT-CONTROL = COLDEST COOL-CONTROL = WARMEST  
 OA-CONTROL = FIXED SUPPLY-CFM = 7820.  
 RATED-CFM = 7820. MIN-OUTSIDE-AIR = 0.1  
 MIN-AIR-SCH = S\_OA@10% SUPPLY-DELTA-T = 2.7  
 SUPPLY-KW = 0.00088  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF RETURN-STATIC = 0.7  
 RETURN-EFF = 0.77 NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 248100.  
 COOL-SH-CAP = 198484. HEATING-CAPACITY = -299800.  
 RETURN-AIR-PATH = PLENUM-ZONES  
 ZONE-NAMES = (SPACE\_1, SPACE\_2, SPACE\_3, SPACE\_4,  
 PLENUM\_1)  
 PLENUM-NAMES = (PLENUM\_1) ..

## \$ HOURLY REPORT DESCRIPTION

AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = MZ-FAN-SYS



```

                VARIABLE-LIST = (3,5,6,17,18,19) ..
ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = SPACE_3
                VARIABLE-LIST = (17,18,7,6) ..
HRLY-AHU      = HOURLY-REPORT  REPORT-SCHEDULE = HRLY-SCHED
                REPORT-BLOCK = (AHU-BLOCK)
..
HRLY-ZONE     = HOURLY-REPORT  REPORT-SCHEDULE = HRLY-SCHED
                REPORT-BLOCK = (ZONE-BLOCK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *   EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *   DENVER,      CO      80227      *

        LINE-4 *RUN #2 DDC CONTROL FOR BLDG. #7108      *
        LINE-5 *BN ADMIN & CLRM                        * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
PLANT-REPORT VERIFICATION=(PV-A)
            SUMMARY=(PS-B,BEPS)
            HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON      =DAY-SCHEDULE (1,24) (1.) ..

PD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

PW_OFF     =WEEK-SCHEDULE (ALL) PD_OFF ..

PW_ON      =WEEK-SCHEDULE (ALL) PD_ON ..

```

## \$ HEATING SEASON

```

P_HEAT     =SCHEDULE THRU MAY 15 PW_ON
            THRU OCT 1 PW_OFF
            THRU DEC 31 PW_ON ..

```

## \$ COOLING SEASON

```

P_COOL     =SCHEDULE THRU MAY 15 PW_OFF
            THRU OCT 1 PW_ON
            THRU DEC 31 PW_OFF ..

```



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8:13: 0 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>41.885<br>100.555<br>31/10 | NATURAL-GAS<br>118.361<br>326.549<br>15/ 8 |
|-----|--|---|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 41.885<br>100.555<br>31/10                | 118.361<br>326.549<br>15/ 8                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.630<br>100.555<br>28/10                | 87.334<br>290.688<br>3/ 5                  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.160<br>100.555<br>31/ 9                | 60.718<br>237.466<br>3/ 5                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.865<br>100.555<br>5/ 8                 | 13.900<br>163.678<br>5/ 5                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 47.231<br>190.643<br>31/18                | 2.246<br>63.050<br>9/ 5                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 63.191<br>189.581<br>28/16                | 0.000<br>0.000<br>30/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 68.657<br>196.192<br>22/16                | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 72.938<br>206.254<br>11/16                | 0.000<br>0.000<br>31/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.454<br>189.902<br>7/16                 | 0.000<br>0.000<br>30/ 1                    |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.410<br>100.555<br>20/ 9                | 10.030<br>162.641<br>20/ 5                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 38.565<br>100.555<br>30/ 9                | 50.911<br>232.116<br>3/ 5                  |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 41.798<br>100.555<br>30/18                | 105.386<br>282.760<br>15/ 2                |
|     | ONE YEAR<br>USE/PEAK                             | 581.783<br>206.254                        | 448.885<br>326.549                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8:13: 0 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 16.54       | 448.88      |
| SPACE COOL                                       | 106.08      | 0.00        |
| HVAC AUX   | 247.04      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 182.00      | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 30.11       | 0.00        |
| TOTAL  | 581.77      | 448.88      |

TOTAL SITE ENERGY 1030.67 MBTU 84.0 KBTU/SQFT-YR GROSS-AREA 84.6 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2195.98 MBTU 178.9 KBTU/SQFT-YR GROSS-AREA 180.3 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 6.8  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



```

E-W      HEIGHT = 5.5  WIDTH = 168.0  CONS = SIDW/FAC
        AZIMUTH = 130  SKY-FORM-FACTOR = 0.5
        GND-FORM-FACTOR = 0.5  ..

E-W      HEIGHT = 5.5  WIDTH = 168.0  CONS = SIDW/FAC
        AZIMUTH = 310  SKY-FORM-FACTOR = 0.5
        GND-FORM-FACTOR = 0.5  ..

E-W      HEIGHT = 5.5  WIDTH = 78.0  CONS = SIDW/FAC
        AZIMUTH = 220  SKY-FORM-FACTOR = 0.5
        GND-FORM-FACTOR = 0.5  ..

E-W      HEIGHT = 5.5  WIDTH = 78.0  CONS = SIDW/FAC
        AZIMUTH = 40   SKY-FORM-FACTOR = 0.5
        GND-FORM-FACTOR = 0.5  ..

ROOF     HEIGHT = 78.0  WIDTH = 220.0  CONS = ROOF-1
        TILT = 0   SKY-FORM-FACTOR = 1.0  ..

```

## \$ HOURLY REPORT DESCRIPTION

```

OUTDOOR-BK =REPORT-BLOCK VARIABLE-TYPE = GLOBAL
            VARIABLE-LIST = (3,4) ..

```

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #3 ECONOMIZER FOR BLDG. #7108      *
        LINE-5 *BN ADMIN & CLRM      * ..

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES  ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE  (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..
SD_WT_HT   =DAY-SCHEDULE  (1,5) (55.)
                (6,18) (74.)

```

```

(19,24) (55.) ..
SD_SM_CL =DAY-SCHEDULE (1,5) (85.)
(6,18) (72.)
(19,24) (85.) ..
SD_10%_OA =DAY-SCHEDULE (1,24) (0.1) ..
SD_WT_CL =DAY-SCHEDULE (1,5) (55.2)
(6,18) (74.2)
(19,24) (55.2) ..
SD_SM_HT =DAY-SCHEDULE (1,5) (84.8)
(6,18) (71.8)
(19,24) (84.8) ..
SD_FAN_CYC =DAY-SCHEDULE (1,5) (-1.)
(6,18) (1.)
(19,24) (-1.) ..

SW_ON =WEEK-SCHEDULE (ALL) SD_ON ..
SW_OFF =WEEK-SCHEDULE (ALL) SD_OFF ..
SW_WT_HT =WEEK-SCHEDULE (ALL) SD_WT_HT ..
SW_SM_CL =WEEK-SCHEDULE (ALL) SD_SM_CL ..
SW_10%_OA =WEEK-SCHEDULE (ALL) SD_10%_OA ..
SW_WT_CL =WEEK-SCHEDULE (ALL) SD_WT_CL ..
SW_SM_HT =WEEK-SCHEDULE (ALL) SD_SM_HT ..
SW_FAN_CYC =WEEK-SCHEDULE (ALL) SD_FAN_CYC ..

$ FULL ON SYSTEM
S_ON =SCHEDULE THRU DEC 31 SW_ON ..

$ FULL OFF SYSTEM
S_OFF =SCHEDULE THRU DEC 31 SW_OFF ..

$ HEATING SEASON
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
THRU OCT 1 SW_OFF
THRU DEC 31 SW_ON ..

$ COOLING SEASON
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
THRU OCT 1 SW_ON
THRU DEC 31 SW_OFF ..

$ HEATING TEMP
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
THRU OCT 1 SW_SM_HT
THRU DEC 31 SW_WT_HT ..

$ COOLING TEMP
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
THRU OCT 1 SW_SM_CL

```

THRU DEC 31 SW\_WT\_CL ..

\$ 10% OA 100% OF THE TIME

S\_OA@10% =SCHEDULE THRU DEC 31 SW\_10%\_OA ..

HRLY-SCHED =SCHEDULE THRU JAN 30 SW\_OFF  
 THRU JAN 31 SW\_ON  
 THRU AUG 10 SW\_OFF  
 THRU AUG 11 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

## \$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_4 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

PLENUM\_1 =ZONE DESIGN-HEAT-T = 72.0 DESIGN-COOL-T = 74.0  
 ZONE-TYPE = PLENUM THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ-FAN-SYS =SYSTEM SYSTEM-TYPE = MZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
ECONO-LIMIT-T = 70.0 HEAT-CONTROL = COLDEST  
 COOL-CONTROL = WARMEST SUPPLY-CFM = 7820.  
 RATED-CFM = 7820. MIN-OUTSIDE-AIR = 0.1  
 FAN-SCHEDULE = S\_FAN\_CYC SUPPLY-DELTA-T = 2.7



```

SUPPLY-KW = 0.00088
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY RETURN-STATIC = 0.7
RETURN-EFF = 0.77 NIGHT-VENT-DT = 0.0
MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 248100.
COOL-SH-CAP = 198484. HEATING-CAPACITY = -299800.
RETURN-AIR-PATH = PLENUM-ZONES
ZONE-NAMES = (SPACE_1, SPACE_2, SPACE_3, SPACE_4,
              PLENUM_1)
PLENUM-NAMES = (PLENUM_1) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = MZ-FAN-SYS
              VARIABLE-LIST = (3,5,6,17,18,19,23,39) ..
ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = SPACE_3
              VARIABLE-LIST = (17,18,7,6) ..
HRLY-AHU    = HOURLY-REPORT REPORT-SCHEDULE = HRLY-SCHED
              REPORT-BLOCK = (AHU-BLOCK)
..
HRLY-ZONE   = HOURLY-REPORT REPORT-SCHEDULE = HRLY-SCHED
              REPORT-BLOCK = (ZONE-BLOCK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #3 ECONOMIZER FOR BLDG. #7108      *
        LINE-5 *BN ADMIN & CLRM                        * ..

```

```

ABORT          ERRORS ..
DIAGNOSTIC     WARNINGS ..
PLANT-REPORT   VERIFICATION=(PV-A)
                SUMMARY=(PS-B,BEPS)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON         =DAY-SCHEDULE (1,24) (1.) ..
PD_OFF        =DAY-SCHEDULE (1,24) (0.) ..

```

| EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8:16:34 SDL RUN 1 |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
|---|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO RUN #3 ECONOMIZER FOR BLDG. #7108 BN ADMIN & CLRM TOPEKA, KS                             |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-FAN-SYS  |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----   |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
| MONTH   | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -72.294                     | 15                      | -8.F                 | -9.F                 | -343.803                                | 8286.                              | 27.438                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -53.879                     | 3                       | -1.F                 | -2.F                 | -338.988                                | 7493.                              | 27.438                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -40.477                     | 4                       | 14.F                 | 12.F                 | -327.051                                | 8780.                              | 27.438                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -14.530                     | 5                       | 31.F                 | 28.F                 | -257.431                                | 8186.                              | 27.438                          |
| MAY   | 20.61729                    | 31 18                   | 90.F                 | 76.F                 | 270.260                                 | -3.682                      | 1                       | 37.F                 | 37.F                 | -205.377                                | 8289.                              | 29.589                          |
| JUN   | 55.40369                    | 29 15                   | 88.F                 | 75.F                 | 273.388                                 | 0.000                       |                         |                      |                      | 0.000                                   | 8434.                              | 28.983                          |
| JUL   | 71.55746                    | 7 18                    | 83.F                 | 74.F                 | 298.085                                 | 0.000                       |                         |                      |                      | 0.000                                   | 8040.                              | 27.438                          |
| AUG   | 73.18030                    | 4 17                    | 92.F                 | 70.F                 | 291.513                                 | 0.000                       |                         |                      |                      | 0.000                                   | 8780.                              | 27.438                          |
| SEP   | 36.54521                    | 7 16                    | 93.F                 | 76.F                 | 259.242                                 | 0.000                       |                         |                      |                      | 0.000                                   | 8188.                              | 29.325                          |
| OCT   | 0.12637                     | 1 18                    | 83.F                 | 68.F                 | 42.923                                  | -11.874                     | 20                      | 24.F                 | 23.F                 | -275.227                                | 8040.                              | 27.438                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -34.186                     | 3                       | 13.F                 | 12.F                 | -328.386                                | 7940.                              | 27.438                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -64.897                     | 12                      | 3.F                  | 2.F                  | -334.846                                | 8286.                              | 27.438                          |
| TOTAL   | 257.431                     |                         |                      |                      | 298.085                                 | -295.819                    |                         |                      |                      | -343.803                                | 98742.                             | 29.589                          |
| MAX   |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |

| EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8:16:34 SDL RUN 1 |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
|---|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO RUN #3 ECONOMIZER FOR BLDG. #7108 BN ADMIN & CLRM TOPEKA, KS                             |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-FAN-SYS   |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----   |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| MONTH   | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | --COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN   | 0                        | 403                      | 0  | 341               | 744                        | 0                          | 403                          | 0                         | 0                                    | 0.000  | 0.000  |
| FEB   | 0                        | 364                      | 0  | 308               | 672                        | 0                          | 364                          | 0                         | 0                                    | 0.000  | 0.000  |
| MAR   | 0                        | 403                      | 0  | 341               | 744                        | 0                          | 403                          | 0                         | 0                                    | 0.000  | 0.000  |
| APR   | 0                        | 324                      | 0  | 396               | 720                        | 0                          | 390                          | 0                         | 66                                   | 0.000  | 0.000  |
| MAY   | 160                      | 134                      | 0  | 450               | 360                        | 384                        | 403                          | 0                         | 109                                  | 0.000  | 27.438   |
| JUN   | 352                      | 0                        | 0  | 368               | 0                          | 720                        | 390                          | 0                         | 38                                   | 0.000  | 27.438   |
| JUL   | 396                      | 0                        | 0  | 348               | 0                          | 744                        | 403                          | 0                         | 7                                    | 0.000  | 27.438   |
| AUG   | 396                      | 0                        | 0  | 348               | 0                          | 744                        | 403                          | 0                         | 7                                    | 0.000  | 27.438   |
| SEP   | 262                      | 0                        | 0  | 458               | 0                          | 720                        | 390                          | 0                         | 128                                  | 0.000  | 27.438   |
| OCT   | 4                        | 318                      | 0  | 422               | 720                        | 24                         | 403                          | 0                         | 81                                   | 0.000  | 7.716  |
| NOV   | 0                        | 370                      | 0  | 350               | 720                        | 0                          | 390                          | 0                         | 20                                   | 0.000  | 0.000  |
| DEC   | 0                        | 403                      | 0  | 341               | 744                        | 0                          | 403                          | 0                         | 0                                    | 0.000  | 0.000  |
| ANNUAL  | 1570                     | 2719                     | 0  | 4471              | 5424                       | 3336                       | 4745                         | 0                         | 456                                  |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8:16:34 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>31.742<br>102.781<br>31/12 | NATURAL-GAS<br>99.860<br>432.378<br>15/ 6 |
|-----|--|---|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 28.552<br>102.781<br>28/12                | 76.340<br>427.327<br>3/ 6                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 32.625<br>102.781<br>31/11                | 58.921<br>414.748<br>4/ 6                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 29.372<br>102.781<br>25/ 7                | 22.730<br>339.759<br>5/ 6                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 36.349<br>187.202<br>31/18                | 6.167<br>281.874<br>1/ 6                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 48.645<br>187.171<br>28/16                | 0.000<br>0.000<br>30/ 1                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.849<br>192.329<br>22/16                | 0.000<br>0.000<br>31/ 1                   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 56.476<br>198.964<br>11/16                | 0.000<br>0.000<br>31/ 1                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 41.412<br>187.908<br>7/16                 | 0.000<br>0.000<br>30/ 1                   |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 28.895<br>102.781<br>31/ 9                | 19.329<br>359.193<br>20/ 6                |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 29.504<br>102.781<br>30/12                | 50.464<br>416.159<br>3/ 6                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 31.641<br>102.781<br>30/18                | 90.888<br>422.972<br>12/ 6                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 448.061<br>198.964                        | 424.700<br>432.378                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8:16:34 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 14.03       | 424.70      |
| SPACE COOL      | 86.77       | 0.00        |
| HVAC AUX        | 135.15      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 182.00      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 30.11       | 0.00        |
| TOTAL           | 448.06      | 424.70      |

TOTAL SITE ENERGY 872.76 MBTU 71.1 KBTU/SQFT-YR GROSS-AREA 71.7 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1770.23 MBTU 144.2 KBTU/SQFT-YR GROSS-AREA 145.4 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 13.5  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



E-W HEIGHT = 5.5 WIDTH = 168.0 CONS = SIDW/FAC  
 AZIMUTH = 130 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 5.5 WIDTH = 168.0 CONS = SIDW/FAC  
 AZIMUTH = 310 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 5.5 WIDTH = 78.0 CONS = SIDW/FAC  
 AZIMUTH = 220 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 5.5 WIDTH = 78.0 CONS = SIDW/FAC  
 AZIMUTH = 40 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 78.0 WIDTH = 220.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

# \$ HOURLY REPORT DESCRIPTION

OUTDOOR-BK =REPORT-BLOCK VARIABLE-TYPE = GLOBAL  
 VARIABLE-LIST = (3,4) ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #4 NIGHTTIME INFILT. FOR BLDG. #7108 \*

LINE-5 \*BN ADMIN & CLRM \* ..

ABORT ERRORS ..

DIAGNOSTIC WARNINGS ..

SYSTEMS-REPORT VERIFICATION=(SV-A)

SUMMARY=(SS-A,SS-C,SS-K,SS-O)

HOURLY-DATA-SAVE = YES ..

# \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..

SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

SD\_WT\_HT =DAY-SCHEDULE (1,24) (74.) ..

SD\_SM\_CL =DAY-SCHEDULE (1,24) (72.) ..

```

SD_10%_OA  =DAY-SCHEDULE  (1,5) (0.)
                (6,18) (0.1)
                (19,24) (0.) ..
SD_WT_CL   =DAY-SCHEDULE  (1,24) (74.2) ..
SD_SM_HT   =DAY-SCHEDULE  (1,24) (71.8) ..

SW_ON      =WEEK-SCHEDULE  (ALL) SD_ON  ..

SW_OFF     =WEEK-SCHEDULE  (ALL) SD_OFF  ..

SW_WT_HT   =WEEK-SCHEDULE  (ALL) SD_WT_HT ..

SW_SM_CL   =WEEK-SCHEDULE  (ALL) SD_SM_CL ..

SW_10%_OA  =WEEK-SCHEDULE  (ALL) SD_10%_OA ..

SW_WT_CL   =WEEK-SCHEDULE  (ALL) SD_WT_CL ..

SW_SM_HT   =WEEK-SCHEDULE  (ALL) SD_SM_HT ..

```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON  ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF  ..
```

## \$ HEATING SEASON

```
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
                THRU OCT  1 SW_OFF
                THRU DEC 31 SW_ON  ..
```

## \$ COOLING SEASON

```
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
                THRU OCT  1 SW_ON
                THRU DEC 31 SW_OFF  ..
```

## \$ HEATING TEMP

```
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
                THRU OCT  1 SW_SM_HT
                THRU DEC 31 SW_WT_HT  ..
```

## \$ COOLING TEMP

```
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
                THRU OCT  1 SW_SM_CL
                THRU DEC 31 SW_WT_CL  ..
```

## \$ 10% OA 100% OF THE TIME

```
S_OA@10%  =SCHEDULE THRU DEC 31 SW_10%_OA  ..
```

## HRLY-SCHED =SCHEDULE THRU JAN 12 SW\_OFF

```

                THRU JAN 13 SW_ON
                THRU AUG 15 SW_OFF
                THRU AUG 16 SW_ON
                THRU DEC 31 SW_OFF  ..
```

## \$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..


SPACE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_4 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

PLENUM\_1 =ZONE DESIGN-HEAT-T = 72.0 DESIGN-COOL-T = 74.0  
 ZONE-TYPE = PLENUM THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ-FAN-SYS =SYSTEM SYSTEM-TYPE = MZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 OA-CONTROL = FIXED SUPPLY-CFM = 7820.  
 RATED-CFM = 7820. MIN-OUTSIDE-AIR = 0.1  
 MIN-AIR-SCH = S\_OA@10% SUPPLY-DELTA-T = 2.7   
 SUPPLY-KW = 0.00088  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF RETURN-STATIC = 0.7  
 RETURN-EFF = 0.77 NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 248100.  
 COOL-SH-CAP = 198484. HEATING-CAPACITY = -299800.  
 RETURN-AIR-PATH = PLENUM-ZONES  
 ZONE-NAMES = (SPACE\_1, SPACE\_2, SPACE\_3, SPACE\_4,  
 PLENUM\_1)  
 PLENUM-NAMES = (PLENUM\_1) ..

## \$ HOURLY REPORT DESCRIPTION



```

AHU-BLOCK  =REPORT-BLOCK VARIABLE-TYPE = MZ-FAN-SYS
              VARIABLE-LIST = (3,5,6,17,18,19) ..
ZONE-BLOCK  =REPORT-BLOCK VARIABLE-TYPE = SPACE_3
              VARIABLE-LIST = (17,18,7,6) ..
HRLY-AHU    = HOURLY-REPORT  REPORT-SCHEDULE = HRLY-SCHED
              REPORT-BLOCK = (AHU-BLOCK)

..
HRLY-ZONE    = HOURLY-REPORT  REPORT-SCHEDULE = HRLY-SCHED
              REPORT-BLOCK = (ZONE-BLOCK)

..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #4 NIGHTIME INFILT. FOR BLDG. #7108 *
        LINE-5 *BN ADMIN & CLRM                      * ..

```

```

ABORT          ERRORS ..
DIAGNOSTIC     WARNINGS ..
PLANT-REPORT   VERIFICATION=(PV-A)
                SUMMARY=(PS-B,BEPS)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON          =DAY-SCHEDULE  (1,24) (1.) ..
PD_OFF         =DAY-SCHEDULE  (1,24) (0.) ..

PW_OFF         =WEEK-SCHEDULE  (ALL) PD_OFF ..
PW_ON          =WEEK-SCHEDULE  (ALL) PD_ON  ..

```

## \$ HEATING SEASON

```

P_HEAT        =SCHEDULE THRU MAY 15 PW_ON
                THRU OCT  1 PW_OFF
                THRU DEC 31 PW_ON  ..

```

## \$ COOLING SEASON

```

P_COOL        =SCHEDULE THRU MAY 15 PW_OFF
                THRU OCT  1 PW_ON
                THRU DEC 31 PW_OFF ..

```

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8:18:57 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHTTIME INFILT. FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-FAN-SYS TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                            |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -82.443                     | 15                      | 8                    | -6.F                 | -7.F                                    | 10918.                             | 27.438                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -59.633                     | 3                       | 6                    | -1.F                 | -2.F                                    | 9869.                              | 27.438                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -41.478                     | 6                       | 8                    | 26.F                 | 25.F                                    | 11411.                             | 27.438                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -9.962                      | 5                       | 6                    | 31.F                 | 28.F                                    | 10732.                             | 27.438                          |
| MAY   | 31.06560                    | 31                      | 18                   | 90.F                 | 76.F                                    | -1.335                      | 9                       | 6                    | 44.F                 | 44.F                                    | 10918.                             | 27.438                          |
| JUN   | 73.35986                    | 29                      | 15                   | 88.F                 | 75.F                                    | 0.000                       |                         |                      |                      |   | 10979.                             | 27.438                          |
| JUL   | 88.47661                    | 7                       | 18                   | 83.F                 | 74.F                                    | 0.000                       |                         |                      |                      |   | 10671.                             | 27.438                          |
| AUG   | 91.48322                    | 4                       | 17                   | 92.F                 | 70.F                                    | 0.000                       |                         |                      |                      |   | 11411.                             | 27.438                          |
| SEP   | 48.36908                    | 7                       | 15                   | 92.F                 | 76.F                                    | 0.000                       |                         |                      |                      |   | 10732.                             | 27.438                          |
| OCT   | 0.27038                     | 1                       | 18                   | 83.F                 | 68.F                                    | -7.796                      | 20                      | 6                    | 24.F                 | 23.F                                    | 10671.                             | 27.438                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -34.798                     | 12                      | 7                    | 21.F                 | 20.F                                    | 10486.                             | 27.438                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -72.499                     | 12                      | 6                    | 3.F                  | 2.F                                     | 10918.                             | 27.438                          |
| TOTAL | 333.025                     |                         |                      |                      |   | -309.939                    |                         |                      |                      |   | 129722.                            |                                 |
| MAX   |                             |                         |                      |                      | 300.323                                 |                             |                         |                      |                      | -272.958                                |                                    | 27.438                          |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8:18:57 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHTTIME INFILT. FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-FAN-SYS TOPEKA, KS

| HOURS COOLING LOAD |              | HOURS HEATING LOAD |              | HOURS COINCIDENT COOL-HEAT LOAD |          | N U M B E R O F H O U R S |                      |                        |                     | --COINCIDENT LOADS--        |  |                                    |
|--------------------|--------------|--------------------|--------------|---------------------------------|----------|---------------------------|----------------------|------------------------|---------------------|-----------------------------|--|------------------------------------|
| MONTH              | COOLING LOAD | HEATING LOAD       | HEATING LOAD | COOL-HEAT LOAD                  | FLOATING | HOURS HEATING AVAIL.      | HOURS COOLING AVAIL. | HOURS FANS ON CYCLE ON | HOURS NIGHT VENTING | HOURS FLOATING WHEN FANS ON | HEATING LOAD AT COOLING PEAK (KBTU/HR) | ELECTRIC LOAD AT COOLING PEAK (KW) |
| JAN                | 0            | 744                | 0            | 0                               | 0        | 744                       | 0                    | 744                    | 0                   | 0                           | -86.034                                | 7.716                              |
| FEB                | 0            | 672                | 0            | 0                               | 0        | 672                       | 0                    | 672                    | 0                   | 0                           | -88.026                                | 7.716                              |
| MAR                | 0            | 744                | 0            | 0                               | 0        | 744                       | 0                    | 744                    | 0                   | 0                           | -85.579                                | 7.716                              |
| APR                | 0            | 720                | 0            | 0                               | 0        | 720                       | 0                    | 720                    | 0                   | 0                           | -0.037                                 | 7.716                              |
| MAY                | 327          | 360                | 0            | 0                               | 57       | 360                       | 384                  | 744                    | 0                   | 57                          | 0.000                                  | 27.438                             |
| JUN                | 680          | 0                  | 0            | 0                               | 40       | 0                         | 720                  | 720                    | 0                   | 40                          | 0.000                                  | 27.438                             |
| JUL                | 739          | 0                  | 0            | 0                               | 5        | 0                         | 744                  | 744                    | 0                   | 5                           | 0.000                                  | 27.438                             |
| AUG                | 733          | 0                  | 0            | 0                               | 11       | 0                         | 744                  | 744                    | 0                   | 11                          | 0.000                                  | 27.438                             |
| SEP                | 527          | 0                  | 0            | 0                               | 193      | 0                         | 720                  | 720                    | 0                   | 193                         | 0.000                                  | 27.438                             |
| OCT                | 8            | 720                | 0            | 0                               | 16       | 720                       | 24                   | 744                    | 0                   | 16                          | 0.000                                  | 7.716                              |
| NOV                | 0            | 720                | 0            | 0                               | 0        | 720                       | 0                    | 720                    | 0                   | 0                           | -104.373                               | 7.716                              |
| DEC                | 0            | 744                | 0            | 0                               | 0        | 744                       | 0                    | 744                    | 0                   | 0                           | -122.944                               | 7.716                              |
| ANNUAL             | 3014         | 5424               | 0            | 0                               | 322      | 5424                      | 3336                 | 8760                   | 0                   | 322                         |  |                                    |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8:18:57 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHTTIME INFILT. FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR | ELECTRICITY<br>42.253<br>100.907<br>31/10 | NATURAL-GAS<br>119.297<br>343.282<br>15/ 8 |
|-----|--|---|--|
| JAN | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 42.253<br>100.907<br>31/10                | 119.297<br>343.282<br>15/ 8                |
| FEB | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 37.992<br>100.907<br>28/10                | 89.637<br>290.591<br>3/ 6                  |
| MAR | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 42.586<br>100.907<br>31/ 9                | 64.529<br>245.135<br>6/ 8                  |
| APR | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 38.387<br>100.907<br>15/ 8                | 17.780<br>164.035<br>5/ 6                  |
| MAY | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 49.986<br>189.118<br>31/18                | 3.161<br>95.412<br>9/ 6                    |
| JUN | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 65.837<br>188.305<br>28/16                | 0.000<br>0.000<br>30/ 1                    |
| JUL | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 70.553<br>193.600<br>22/16                | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 74.859<br>199.463<br>11/16                | 0.000<br>0.000<br>31/ 1                    |
| SEP | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 56.135<br>189.209<br>7/16                 | 0.000<br>0.000<br>30/ 1                    |
| OCT | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 38.206<br>100.907<br>20/10                | 14.469<br>177.291<br>20/ 6                 |
| NOV | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 39.061<br>100.907<br>30/11                | 54.885<br>232.439<br>12/ 7                 |
| DEC | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 42.166<br>100.907<br>30/18                | 107.475<br>278.254<br>12/ 6                |
|     | ONE YEAR<br>USE/PEAK                           | 598.021<br>199.463                        | 471.234<br>343.282                         |

| ENERGY TYPE   |             |              |                               |
|---|-------------|--------------|-------------------------------|
| IN SITE MBTU -  |             |              |                               |
| CATEGORY OF USE   | ELECTRICITY | NATURAL-GAS  |                               |
| SPACE HEAT  | 18.57       | 471.24       |                               |
| SPACE COOL  | 118.39      | 0.00         |                               |
| HVAC AUX  | 248.93      | 0.00         |                               |
| DOM HOT WTR   | 0.00        | 0.00         |                               |
| AUX SOLAR   | 0.00        | 0.00         |                               |
| LIGHTS  | 181.99      | 0.00         |                               |
| VERT TRANS  | 0.00        | 0.00         |                               |
| MISC EQUIP  | 30.11       | 0.00         |                               |
| TOTAL   | 597.99      | 471.24       |                               |
| TOTAL SITE ENERGY   |             | 1069.26 MBTU | 87.1 KBTU/SQFT-YR GROSS-AREA  |
| TOTAL SOURCE ENERGY   |             | 2267.09 MBTU | 184.7 KBTU/SQFT-YR GROSS-AREA |
| PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE =  |             | 3.4          |                               |
| PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED   |             | 0.0          |                               |
| NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY. |             |              |                               |



```

E-W      HEIGHT = 5.5  WIDTH = 168.0  CONS = SIDW/FAC
        AZIMUTH = 130  SKY-FORM-FACTOR = 0.5
        GND-FORM-FACTOR = 0.5  ..

E-W      HEIGHT = 5.5  WIDTH = 168.0  CONS = SIDW/FAC
        AZIMUTH = 310  SKY-FORM-FACTOR = 0.5
        GND-FORM-FACTOR = 0.5  ..

E-W      HEIGHT = 5.5  WIDTH = 78.0  CONS = SIDW/FAC
        AZIMUTH = 220  SKY-FORM-FACTOR = 0.5
        GND-FORM-FACTOR = 0.5  ..

E-W      HEIGHT = 5.5  WIDTH = 78.0  CONS = SIDW/FAC
        AZIMUTH = 40   SKY-FORM-FACTOR = 0.5
        GND-FORM-FACTOR = 0.5  ..

ROOF     HEIGHT = 78.0  WIDTH = 220.0  CONS = ROOF-1
        TILT = 0   SKY-FORM-FACTOR = 1.0  ..

```

## \$ HOURLY REPORT DESCRIPTION

```

OUTDOOR-BK =REPORT-BLOCK VARIABLE-TYPE = GLOBAL
            VARIABLE-LIST = (3,4) ..

```

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #5 DAYTIME INFILT. FOR BLDG. #7108 *
        LINE-5 *BN ADMIN & CLRM      * ..

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
SD_WT_HT   =DAY-SCHEDULE (1,24) (74.) ..
SD_SM_CL   =DAY-SCHEDULE (1,24) (72.) ..

```

```

SD_10%_OA  =DAY-SCHEDULE  (1,5) (0.1)
                        (6,18) (0.)
                        (19,24) (0.1) ..
SD_WT_CL   =DAY-SCHEDULE  (1,24) (74.2) ..
SD_SM_HT   =DAY-SCHEDULE  (1,24) (71.8) ..

SW_ON      =WEEK-SCHEDULE  (ALL) SD_ON  ..

SW_OFF     =WEEK-SCHEDULE  (ALL) SD_OFF  ..

SW_WT_HT   =WEEK-SCHEDULE  (ALL) SD_WT_HT ..

SW_SM_CL   =WEEK-SCHEDULE  (ALL) SD_SM_CL ..

SW_10%_OA  =WEEK-SCHEDULE  (ALL) SD_10%_OA ..

SW_WT_CL   =WEEK-SCHEDULE  (ALL) SD_WT_CL ..

SW_SM_HT   =WEEK-SCHEDULE  (ALL) SD_SM_HT ..

```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON  ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF  ..
```

## \$ HEATING SEASON

```
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
                THRU OCT  1 SW_OFF
                THRU DEC 31 SW_ON  ..
```

## \$ COOLING SEASON

```
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
                THRU OCT  1 SW_ON
                THRU DEC 31 SW_OFF  ..
```

## \$ HEATING TEMP

```
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
                THRU OCT  1 SW_SM_HT
                THRU DEC 31 SW_WT_HT  ..
```

## \$ COOLING TEMP

```
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
                THRU OCT  1 SW_SM_CL
                THRU DEC 31 SW_WT_CL  ..
```

## \$ 10% OA 100% OF THE TIME

```
S_OA@10%  =SCHEDULE THRU DEC 31 SW_10%_OA ..
```

## HRLY-SCHED =SCHEDULE THRU JAN 12 SW\_OFF

```

                THRU JAN 13 SW_ON
                THRU AUG 15 SW_OFF
                THRU AUG 16 SW_ON
                THRU DEC 31 SW_OFF  ..
```

## \$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..


SPACE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_4 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

PLENUM\_1 =ZONE DESIGN-HEAT-T = 72.0 DESIGN-COOL-T = 74.0  
 ZONE-TYPE = PLENUM THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ-FAN-SYS =SYSTEM SYSTEM-TYPE = MZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 OA-CONTROL = FIXED SUPPLY-CFM = 7820.  
 RATED-CFM = 7820. MIN-OUTSIDE-AIR = 0.1  
 MIN-AIR-SCH = S\_OA@10% SUPPLY-DELTA-T = 2.7   
 SUPPLY-KW = 0.00088  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF RETURN-STATIC = 0.7  
 RETURN-EFF = 0.77 NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 248100.  
 COOL-SH-CAP = 198484. HEATING-CAPACITY = -299800.  
 RETURN-AIR-PATH = PLENUM-ZONES  
 ZONE-NAMES = (SPACE\_1, SPACE\_2, SPACE\_3, SPACE\_4,  
 PLENUM\_1)  
 PLENUM-NAMES = (PLENUM\_1) ..

## \$ HOURLY REPORT DESCRIPTION



```

AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = MZ-FAN-SYS
              VARIABLE-LIST = (3,5,6,17,18,19) ..
ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = SPACE_3
              VARIABLE-LIST = (17,18,7,6) ..
HRLY-AHU   = HOURLY-REPORT REPORT-SCHEDULE = HRLY-SCHED
              REPORT-BLOCK = (AHU-BLOCK)
..
HRLY-ZONE  = HOURLY-REPORT REPORT-SCHEDULE = HRLY-SCHED
              REPORT-BLOCK = (ZONE-BLOCK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #5 DAYTIME INFILT. FOR BLDG. #7108 *
        LINE-5 *BN ADMIN & CLRM                                * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC WARNINGS ..
PLANT-REPORT VERIFICATION=(PV-A)
              SUMMARY=(PS-B,BEPS)
              HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON      =DAY-SCHEDULE (1,24) (1.) ..

PD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

PW_OFF     =WEEK-SCHEDULE (ALL) PD_OFF ..

PW_ON      =WEEK-SCHEDULE (ALL) PD_ON ..

```

## \$ HEATING SEASON

```

P_HEAT     =SCHEDULE THRU MAY 15 PW_ON
              THRU OCT  1 PW_OFF
              THRU DEC 31 PW_ON ..

```

## \$ COOLING SEASON

```

P_COOL     =SCHEDULE THRU MAY 15 PW_OFF
              THRU OCT  1 PW_ON
              THRU DEC 31 PW_OFF ..

```

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8:21:33 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAYTIME INFILT. FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-FAN-SYS TOPEKA, KS

| MONTH | COOLING                     |                         |                      |                      | HEATING                                 |                             |                         |                      | ELEC                 |   |                           |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -81.103                     | 15                      | 5                    | -9.F                 | -267.516                                | 10918.                    | 27.438                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -58.558                     | 3                       | 5                    | -2.F                 | -240.070                                | 9869.                     | 27.438                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -41.729                     | 3                       | 5                    | 13.F                 | -193.076                                | 11411.                    | 27.438                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -10.499                     | 5                       | 5                    | 29.F                 | -127.463                                | 10732.                    | 27.438                          |
| MAY   | 31.41247                    | 31                      | 19                   | 84.F                 | 76.F                                    | -1.598                      | 9                       | 5                    | 44.F                 | -74.389                                 | 10918.                    | 27.438                          |
| JUN   | 72.31274                    | 29                      | 15                   | 88.F                 | 75.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 10979.                    | 27.438                          |
| JUL   | 86.62682                    | 7                       | 18                   | 83.F                 | 74.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 10671.                    | 27.438                          |
| AUG   | 89.39081                    | 4                       | 17                   | 92.F                 | 70.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 11411.                    | 27.438                          |
| SEP   | 48.50097                    | 14                      | 15                   | 83.F                 | 60.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 10732.                    | 27.438                          |
| OCT   | 0.17676                     | 1                       | 19                   | 81.F                 | 66.F                                    | -8.395                      | 20                      | 5                    | 25.F                 | -131.912                                | 10671.                    | 27.438                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -35.211                     | 3                       | 5                    | 12.F                 | -186.055                                | 10486.                    | 27.438                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -71.406                     | 15                      | 5                    | 7.F                  | -233.218                                | 10918.                    | 27.438                          |
| TOTAL | 328.421                     |                         |                      |                      | 280.826                                 | -308.495                    |                         |                      |                      | -267.516                                | 129722.                   | 27.438                          |
| MAX   |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8:21:33 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAYTIME INFILT. FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-FAN-SYS TOPEKA, KS

| MONTH  | COOLING                  |                          |                            |                   | HEATING                    |                            |                              |                           | ELEC                                 |  |                           |                                 |
|--------|--------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|---------------------------|---------------------------------|
|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN    | 0                        | 744                      | 0                          | 0                 | 744                        | 0                          | 0                            | 0                         | 0                                    | -109.258   | 10918.                    | 27.438                          |
| FEB    | 0                        | 672                      | 0                          | 0                 | 672                        | 0                          | 0                            | 0                         | 0                                    | -113.546   | 9869.                     | 27.438                          |
| MAR    | 0                        | 744                      | 0                          | 0                 | 744                        | 0                          | 0                            | 0                         | 0                                    | -108.494   | 11411.                    | 27.438                          |
| APR    | 0                        | 720                      | 0                          | 0                 | 720                        | 0                          | 0                            | 0                         | 0                                    | -0.036   | 10732.                    | 27.438                          |
| MAY    | 325                      | 360                      | 0                          | 59                | 744                        | 384                        | 0                            | 0                         | 59                                   | 0.000  | 10918.                    | 27.438                          |
| JUN    | 676                      | 0                        | 0                          | 44                | 720                        | 720                        | 0                            | 0                         | 44                                   | 0.000  | 10979.                    | 27.438                          |
| JUL    | 741                      | 0                        | 0                          | 3                 | 744                        | 744                        | 0                            | 0                         | 3                                    | 0.000  | 11411.                    | 27.438                          |
| AUG    | 732                      | 0                        | 0                          | 12                | 744                        | 744                        | 0                            | 0                         | 12                                   | 0.000  | 10732.                    | 27.438                          |
| SEP    | 510                      | 0                        | 0                          | 210               | 720                        | 720                        | 0                            | 0                         | 210                                  | 0.000  | 10671.                    | 27.438                          |
| OCT    | 8                        | 720                      | 0                          | 16                | 744                        | 24                         | 0                            | 0                         | 16                                   | 0.000  | 10486.                    | 27.438                          |
| NOV    | 0                        | 720                      | 0                          | 0                 | 720                        | 0                          | 0                            | 0                         | 0                                    | -139.501   | 10918.                    | 27.438                          |
| DEC    | 0                        | 744                      | 0                          | 0                 | 744                        | 0                          | 0                            | 0                         | 0                                    | -156.051   | 10918.                    | 27.438                          |
| ANNUAL | 2992                     | 5424                     | 0                          | 344               | 5424                       | 3336                       | 8760                         | 0                         | 344                                  |  |                           |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8:21:33 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAYTIME INFILT. FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>41.890<br>100.763<br>31/ 9 | NATURAL-GAS<br>115.601<br>336.437<br>15/ 5 |
|-----|--|---|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.571<br>100.763<br>28/10                | 86.077<br>307.408<br>3/ 5                  |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.350<br>100.763<br>31/ 7                | 63.574<br>256.415<br>3/ 5                  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 38.374<br>99.840<br>5/ 7                  | 18.402<br>182.494<br>5/ 5                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 49.772<br>180.603<br>31/18                | 3.568<br>120.380<br>9/ 5                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 64.899<br>179.581<br>28/16                | 0.000<br>0.000<br>30/ 1                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 69.315<br>183.961<br>22/16                | 0.000<br>0.000<br>31/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 73.438<br>192.869<br>11/16                | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 55.566<br>180.022<br>7/16                 | 0.000<br>0.000<br>30/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 38.183<br>100.130<br>20/ 8                | 15.313<br>187.607<br>20/ 5                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 38.823<br>100.763<br>29/ 8                | 54.142<br>248.656<br>3/ 5                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 41.821<br>100.763<br>30/13                | 104.228<br>300.075<br>15/ 5                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 592.002<br>192.869                        | 460.906<br>336.437                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 5/1995 8:21:33 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAYTIME INFILT. FOR BLDG. #7108 BN ADMIN & CLRM  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE   |  |              |                               |
|---|--|--------------|-------------------------------|
| IN SITE MBTU -  |  | ELECTRICITY  | NATURAL-GAS                   |
| CATEGORY OF USE   |  |              |                               |
| SPACE HEAT  |  | 17.11        | 460.90                        |
| SPACE COOL  |  | 114.81       | 0.00                          |
| HVAC AUX  |  | 247.97       | 0.00                          |
| DOM HOT WTR   |  | 0.00         | 0.00                          |
| AUX SOLAR   |  | 0.00         | 0.00                          |
| LIGHTS  |  | 182.00       | 0.00                          |
| VERT TRANS  |  | 0.00         | 0.00                          |
| MISC EQUIP  |  | 30.11        | 0.00                          |
| TOTAL   |  | 592.00       | 460.90                        |
| -----   |  |              |                               |
| TOTAL SITE ENERGY   |  | 1052.91 MBTU | 85.8 KBTU/SQFT-YR GROSS-AREA  |
| TOTAL SOURCE ENERGY   |  | 2238.69 MBTU | 182.4 KBTU/SQFT-YR GROSS-AREA |
| PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE =  |  | 3.9          |                               |
| PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED   |  | = 0.0        |                               |
| NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY. |  |              |                               |



**COMPUTER ENERGY SIMULATIONS**

**BLDG. 7086  
CHURCH BUILDINGS**



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

BUILDING NO.: 7086  
BLDG. TYPE: UNIT CHAPEL (Sanctuary)

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

## ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3    | RUN4    | RUN5    |
|----------------|---------|---------|---------|---------|---------|---------|
| HEATING (MBtu) | 833.9   | 617.5   | 715.4   | 622.5   | 616.3   | 608.6   |
| COOLING (kWH)  | 121,928 | 110,560 | 113,856 | 108,892 | 117,442 | 114,114 |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 8,008 CFM                         |
| FLOOR AREA     | 4,590 FT²                         |
| CFM/F          | 1842 CFM                          |
| UA             | 2125 BTU/HR-°F                    |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

| EZDOE COMPUTER RUN DEFINITION: |                             |
|--------------------------------|-----------------------------|
| BASERUN                        | EXISTING OPERATION          |
| RUN1                           | NIGHT SETBACK               |
| RUN2                           | DDC CONTROL                 |
| RUN3                           | ECONOMIZER                  |
| RUN4                           | NIGHTTIME INFILTRATION (OA) |
| RUN5                           | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      |            | ANNUAL HEATING & COOLING HOURS |            |
|--------------------|-------------------|------|------------|--------------------------------|------------|
| M-F                | 1800              | 2000 | 10 HR      | HR. ON HEATING                 | 1070 HR/YR |
| SAT.               | 700               | 1800 | 11 HR      | HR. ON COOLING                 | 651 HR/YR  |
| SUN.               | 600               | 1800 | 12 HR      | HR. OFF HEATING                | 4378 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 33 HR/WK   | HR. OFF COOLING                | 2661 HR/YR |
|                    | TOTAL UNOCC. HR.  |      | 135 HR/WK  |                                |            |
|                    | ANNUAL OCCUPY HR. |      | 1721 HR/YR |                                |            |
|                    | ANNUAL UNOCC. HR. |      | 7039 HR/YR |                                |            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING

8760 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY

5448 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

3312 HR/YR

HRS SAVED (HTG ONLY)

5448

1070

=

4378 HR/YR

HRS SAVED (CLG ONLY)

3312

651

=

2661 HR/YR

|           |   |   |               |           |                     |
|-----------|---|---|---------------|-----------|---------------------|
| HOAUHC    | 833.85 MBtu   | - | 616.27 MBtu   | =         | 1.68E+01 Btu/CFM-HR |
|           | 1841.84 CFM   | x | 7039 HR/YR    |           |                     |
| HOAUH     | 833.85 MBtu   | - | 616.27 MBtu   | =         | 2.70E+01 Btu/CFM-HR |
|           | 1841.84 CFM   | x | 4378 HR/YR    |           |                     |
| COAUHC    | 121,927.9 kWH   | - | 117,442.1 kWH | =         | 3.46E-04 kWH/CFM-HR |
|           | 1841.84 CFM   | x | 7039 HR/YR    |           |                     |
| COAUC     | 121,927.9 kWH   | - | 117,442.1 kWH | =         | 9.15E-04 kWH/CFM-HR |
|           | 1841.84 CFM   | x | 2661 HR/YR    |           |                     |
| HOAOHC    | 833.85 MBtu   | - | 608.63 MBtu   | =         | 7.11E+01 Btu/CFM-HR |
|           | 1841.84 CFM   | x | 1721 HR/YR    |           |                     |
| HOAOH     | 833.85 MBtu   | - | 608.63 MBtu   | =         | 1.14E+02 Btu/CFM-HR |
|           | 1841.84 CFM   | x | 1070 HR/YR    |           |                     |
| COAOHC    | 121,927.9 kWH   | - | 114,113.7 kWH | =         | 2.47E-03 kWH/CFM-HR |
|           | 1841.84 CFM   | x | 1721 HR/YR    |           |                     |
| COAOC     | 121,927.9 kWH   | - | 114,113.7 kWH | =         | 6.52E-03 kWH/CFM-HR |
|           | 1841.84 CFM   | x | 651 HR/YR     |           |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | =         | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | =         | 0.17                |
| ECC       | 110,559.6 kWH   | - | 108,892.5 kWH | =         | 3.20E-04 kWH/CFM-HR |
|           | 8008 CFM  | x | 651 HR/YR     |           |                     |
| ECHC      | 110,559.6 kWH   | - | 108,892.5 kWH | =         | 1.21E-04 kWH/CFM-HR |
|           | 8008 CFM  | x | 1721 HR/YR    |           |                     |
| NSUCHC    | 121,927.9 kWH   | - | 110,559.6 kWH | =         | 2.02E-04 kWH/CFM-HR |
|           | 8008 CFM  | x | 7039 HR/YR    |           |                     |
| NSUCC     | 121,927.9 kWH   | - | 110,559.6 kWH | =         | 5.33E-04 kWH/CFM-HR |
|           | 8008 CFM  | x | 2661 HR/YR    |           |                     |
| DDCCHC    | 121,927.9 kWH   | - | 113,855.8 kWH | =         | 5.86E-04 kWH/CFM-HR |
|           | 8008 CFM  | x | 1721 HR/YR    |           |                     |
| DDCCC     | 121,927.9 kWH   | - | 113,855.8 kWH | =         | 1.55E-03 kWH/CFM-HR |
|           | 8008 CFM  | x | 651 HR/YR     |           |                     |
| NSC       | 833.85 MBtu   | - | 617.52 MBtu   | =         | 1.02E+05 Btu/UA     |
|           | 2125.305 UA   |   |               |           |                     |
| DDCH      | 833.85 MBtu   | - | 715.4 MBtu    | =         | 5.57E+04 Btu/UA     |
|           | 2125.305 UA   |   |               |           |                     |
| OPT       | (2 HR/DAY X 240 DAY/YR)                               |   |               | 175 HR/YR |                     |
|           |   |   |               | =         | 305 HR/YR           |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               |           |                     |
|           |   |   |               | =         | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01          | =         | 5.67 HR/YR          |





INPUT LOADS ..

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$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

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## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BLDG. 7086      *
        LINE-5 *UNIT CHAPEL W/ SINGLE ZONE      * ..

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ABORT          ERRORS ..
DIAGNOSTIC     WARNINGS ..
LOADS-REPORT   VERIFICATION=(LV-D)
               SUMMARY=(LS-C,LS-D)
               HOURLY-DATA-SAVE = YES ..
BUILDING-LOCATION LATITUDE = 39.0
                LONGITUDE = 96.5
                ALTITUDE = 1065.
                TIME-ZONE = 6
                GROSS-AREA = 4590
                SHIELDING-COEF = 0.29
                X-REF = 0.0
                Y-REF = 0.0 ..
RUN-PERIOD     JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

```

LD_ON          =DAY-SCHEDULE (1,24) (1.) ..

LD_OFF         =DAY-SCHEDULE (1,24) (0.) ..

LD_SATURDY    =DAY-SCHEDULE (1,6) (0.)
                (7,8) (0.1)
                (9,11) (0.5)
                (12,16) (0.1)
                (17) (0.02)
                (18,24) (0.) ..

LD_SUNDAY     =DAY-SCHEDULE (1,5) (0.)
                (6) (0.01)
                (7,8) (0.5)
                (9,10) (1.)
                (11,14) (0.33,0.25,0.2,0.05)
                (15,17) (0.02)
                (18,24) (0.) ..

LD_WEEKDAY    =DAY-SCHEDULE (1,7) (0.)
                (8) (0.02)

```

(9,16) (0.05)  
 (17,24) (0.) ..

LD\_LITES =DAY-SCHEDULE (1,5) (0.)  
 (6) (0.2)  
 (7,17) (1.)  
 (18) (0.5)  
 (19,24) (0.) ..

LW\_ON =WEEK-SCHEDULE (ALL) LD\_ON ..

LW\_OFF =WEEK-SCHEDULE (ALL) LD\_OFF ..

LW\_CHAPEL =WEEK-SCHEDULE (WD) LD\_WEEKDAY  
 (SAT) LD\_SATURDY  
 (SUN) LD\_SUNDAY  
 (HOL) LD\_SUNDAY ..

LW\_LITES =WEEK-SCHEDULE (ALL) LD\_LITES ..

\$ ON 100% OF THE TIME

L\_ON =SCHEDULE THRU DEC 31 LW\_ON ..

\$ OFF 100% OF THE TIME

L\_OFF =SCHEDULE THRU DEC 31 LW\_OFF ..

\$ CHAPEL SCHEDULE

L\_CHAPEL =SCHEDULE THRU DEC 31 LW\_CHAPEL ..

\$ LIGHTING SCHEDULE

L\_LIGHTS =SCHEDULE THRU DEC 31 LW\_LITES ..

#### \$ CONSTRUCTION TYPES

##### \$ BRICK-CMU WALL W/ INSL

WALL-1 =LAYERS MATERIAL=(BK01,IN22,CB36,AL21,GP04) I-F-R= 0.6100  
 THICKNESS=(0.333,0.083,1.000,0.000,0.063) ..

EXWALL-1 =CONSTRUCTION LAYERS = WALL-1  
 ABSORPTANCE = 0.880  
 ROUGHNESS = 2 ..

FLOOR =CONSTRUCTION U-VALUE = 0.020  
 ABSORPTANCE = 0.610  
 ROUGHNESS = 5 ..

##### \$ SHINGLED ROOF

SHIN-ROF =LAYERS MATERIAL=(AB03,HF-E3,HF-B10,IN73,AL12,AC03)  
 THICKNESS=(0.000,0.031,0.167,0.125,0.000,0.063) ..

ROOF-1 =CONSTRUCTION LAYERS = SHIN-ROF  
 ABSORPTANCE = 0.800

ROUGHNESS = 1 ..

## \$ STANDARD WOOD DOOR

DOOR-STD =LAYERS MATERIAL=(WD12,WD12) I-F-R= 0.6100  
 THICKNESS=(0.083,0.083) ..  
 DOOR-WOD =CONSTRUCTION LAYERS = DOOR-STD  
 ABSORPTANCE = 0.860  
 ROUGHNESS = 5 ..

1\_PN\_STD =GLASS-TYPE GLASS-TYPE-CODE = 8  
 PANES = 1 ..

## \$ SPACE DESCRIPTION

SPACE\_1 =SPACE AREA = 4590.0 VOLUME = 123930.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_CHAPEL NUMBER-OF-PEOPLE = 150.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = INCAND LIGHTING-W/SQFT = 2.2  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LIGHTS  
 SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 2.  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.18  
 INF-SCHEDULE = L\_ON ..

WEST-WALL =E-W HEIGHT = 27.0 WIDTH = 54.0 CONS = EXWALL-1  
 AZIMUTH = 256 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 2.0 WIDTH = 5.0 G-T = 1\_PN\_STD  
 MULTIPLIER = 4.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 15.0 WIDTH = 1.0 G-T = 1\_PN\_STD  
 MULTIPLIER = 3.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.0 WIDTH = 1.0 G-T = 1\_PN\_STD  
 MULTIPLIER = 3.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 2.5 WIDTH = 3.0 CONS = DOOR-WOD  
 MULTIPLIER = 4.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

NORTH-WALL =E-W HEIGHT = 22.5 WIDTH = 97.0 CONS = EXWALL-1  
 AZIMUTH = 346 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 2.0 WIDTH = 5.0 G-T = 1\_PN\_STD  
 MULTIPLIER = 2.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 14.0 WIDTH = 4.0 G-T = 1\_PN\_STD

MULTIPLIER = 8.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 2.5 WIDTH = 3.0 CONS = DOOR-WOD  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

EAST-WALL =E-W HEIGHT = 27.0 WIDTH = 46.0 CONS = EXWALL-1  
 AZIMUTH = 76 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

SOUTH-WALL =E-W HEIGHT = 22.5 WIDTH = 70.0 CONS = EXWALL-1  
 AZIMUTH = 166 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 2.0 WIDTH = 5.0 G-T = 1\_PN\_STD  
 MULTIPLIER = 2.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 14.0 WIDTH = 4.0 G-T = 1\_PN\_STD  
 MULTIPLIER = 4.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 2.5 WIDTH = 3.0 CONS = DOOR-WOD  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 10.0 WIDTH = 459.0 CONS = FLOOR ..

ROOF HEIGHT = 25.0 WIDTH = 97.0 CONS = ROOF-1  
 AZIMUTH = 346 TILT = 21 SKY-FORM-FACTOR = 1.0 ..

ROOF HEIGHT = 35.0 WIDTH = 97.0 CONS = ROOF-1  
 AZIMUTH = 166 TILT = 21 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*BASELINE SIMULATION FOR BLDG. 7086 \*  
 LINE-5 \*UNIT CHAPEL W/ SINGLE ZONE \* ..  
 ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..

SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_W\_HT\_F =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_S\_CL\_F =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_W\_CL\_F =DAY-SCHEDULE (1,24) (75.) ..  
 SD\_S\_HT\_F =DAY-SCHEDULE (1,24) (71.) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_W\_HT\_F =WEEK-SCHEDULE (ALL) SD\_W\_HT\_F ..

SW\_S\_CL\_F =WEEK-SCHEDULE (ALL) SD\_S\_CL\_F ..

SW\_W\_CL\_F =WEEK-SCHEDULE (ALL) SD\_W\_CL\_F ..

SW\_S\_HT\_F =WEEK-SCHEDULE (ALL) SD\_S\_HT\_F ..

## \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
 THRU OCT 1 SW\_S\_HT\_F  
 THRU DEC 31 SW\_W\_HT\_F ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
 THRU OCT 1 SW\_S\_CL\_F  
 THRU DEC 31 SW\_W\_CL\_F ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU AUG 20 SW\_OFF  
 THRU AUG 21 SW\_ON

THRU DEC 31 SW\_OFF ..

\$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 1.0  
 ASSIGNED-CFM = 7700. SIZING-OPTION = FROM-LOADS ..

\$ SYSTEM DESCRIPTION

AC-1 =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED OA-CONTROL = FIXED  
 SUPPLY-CFM = 7700. RATED-CFM = 7700.  
 MIN-OUTSIDE-AIR = 0.23 MAX-OA-FRACTION = 0.23  
 SUPPLY-DELTA-T = 1.8 SUPPLY-KW = 0.00059  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 COOLING-CAPACITY = 250250. COOL-SH-CAP = 200200.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -423500.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (SPACE\_1) ..

\$ HOURLY REPORT DESCRIPTION

ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = SPACE\_1  
 VARIABLE-LIST = (17,18,7,31) ..  
 AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = AC-1  
 VARIABLE-LIST = (3,5,6,17,39) ..  
 ZONE-RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONE-BLOCK)  
 ..  
 AHU-RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (AHU-BLOCK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

\$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*

LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*BASELINE SIMULATION FOR BLDG. 7086 \*

LINE-5 \*UNIT CHAPEL W/ SINGLE ZONE \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
 SUMMARY=(PS-B,BEPS)  
 HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..

PD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

PW\_OFF =WEEK-SCHEDULE (ALL) PD\_OFF ..

PW\_ON =WEEK-SCHEDULE (ALL) PD\_ON ..

#### \$ HEATING SEASON

P\_HEAT =SCHEDULE THRU MAY 15 PW\_ON  
 THRU OCT 1 PW\_OFF  
 THRU DEC 31 PW\_ON ..

#### \$ COOLING SEASON

P\_COOL =SCHEDULE THRU MAY 15 PW\_OFF  
 THRU OCT 1 PW\_ON  
 THRU DEC 31 PW\_OFF ..

#### \$ EQUIPMENT DESCRIPTION

BOIL-HW =PLANT-EQUIPMENT TYPE = HW-BOILER  
 SIZE = -999. ..

REC-ACCU =PLANT-EQUIPMENT TYPE = HERM-REC-CHLR  
 SIZE = -999. INSTALLED-NUMBER = 2  
 MAX-NUMBER-AVAIL = 2 ..

PLANT-PARAMETERS BOILER-FUEL = NATURAL-GAS TWR-PUMP-HEAD = 35.  
 HERM-REC-COND-TYPE = AIR CCIRC-HEAD = 15.0  
 HCIRC-HEAD = 15.0 ..

ENERGY-RESOURCE RESOURCE = ELECTRICITY ..  
 ENERGY-RESOURCE RESOURCE = NATURAL-GAS ..

HEAT-SEASO =LOAD-ASSIGNMENT TYPE = HEATING  
 OPERATION-MODE = RUN-NEEDED  
 LOAD-RANGE = 0.000

PLANT-EQUIPMENT = BOIL-HW

NUMBER = 1 ..

COOL-SEASO =LOAD-ASSIGNMENT TYPE = COOLING

OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000

PLANT-EQUIPMENT = REC-ACCU

NUMBER = 2 ..

END ..

COMPUTE PLANT ..

STOP ..



EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 10:16:38 LDL RUN 1  
DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
REPORT- I.V-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

NUMBER OF EXTERIOR SURFACES 6 RECTANGULAR 6 OTHER 0  
(U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED)

| SURFACE    | SPACE   | - - - G L A S S - - -<br>U-VALUE<br>(BTU/HR-SQFT-F) | - - - W A L L - - -<br>U-VALUE<br>(BTU/HR-SQFT-F) | - - - W A L L + G L A S S -<br>U-VALUE<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) | AZIMUTH    |
|------------|---------|---|---|---|----------------|------------|
| NORTH-WALL | SPACE_1 | 1.021   | 468.00  | 1714.50   | 2182.50        | NORTH      |
| EAST-WALL  | SPACE_1 | 0.000   | 0.00  | 1242.00   | 1242.00        | NORTH-EAST |
| SOUTH-WALL | SPACE_1 | 1.021   | 244.00  | 1331.00   | 1575.00        | SOUTH-EAST |
| WEST-WALL  | SPACE_1 | 1.021   | 97.00   | 1361.00   | 1458.00        | SOUTH-WEST |
|            | SPACE_1 | 0.000   | 0.00  | 2425.00   | 2425.00        | ROOF       |
|            | SPACE_1 | 0.000   | 0.00  | 3395.00   | 3395.00        | ROOF       |
|            | SPACE_1 | 0.000   | 0.00  | 4590.00   | 4590.00        | UNDERGRND  |

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 EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 10:16:38 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

|             | AVERAGE<br>U-VALUE/GLASS<br>(BTU/HR-SQFT-F) | AVERAGE<br>U-VALUE/WALLS<br>(BTU/HR-SQFT-F) | AVERAGE U-VALUE<br>WALLS+GLASS<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | OPAQUE<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) |
|-------------|---|---|---|-------------------------|--------------------------|--------------------------------|
| NORTH       | 1.021                                       | 0.118                                       | 0.312   | 468.00                  | 1714.50                  | 2182.50                        |
| NORTH-EAST  | 0.000                                       | 0.118                                       | 0.118   | 0.00                    | 1242.00                  | 1242.00                        |
| SOUTH-EAST  | 1.021                                       | 0.118                                       | 0.258   | 244.00                  | 1331.00                  | 1575.00                        |
| SOUTH-WEST  | 1.021                                       | 0.118                                       | 0.178   | 97.00                   | 1361.00                  | 1458.00                        |
| ROOF        | 0.000                                       | 0.094                                       | 0.094   | 0.00                    | 5820.00                  | 5820.00                        |
| ALL WALLS   | 1.021                                       | 0.118                                       | 0.231   | 809.00                  | 5648.50                  | 6457.50                        |
| WALLS+ROOFS | 1.021                                       | 0.106                                       | 0.166   | 809.00                  | 11468.50                 | 12277.50                       |
| UNDERGRND   | 0.000                                       | 0.020                                       | 0.020   | 0.00                    | 4590.00                  | 4590.00                        |
| BUILDING    | 1.021                                       | 0.081                                       | 0.126   | 809.00                  | 16058.50                 | 16867.50                       |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 10:16:38 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS

\*\*\* BUILDING \*\*\*

FLOOR AREA 4590 SQFT 426 SQMT  
 VOLUME 123930 CUFT 3510 CUMT

HEATING LOAD

JAN 4 3AM  
 8F -13C  
 7F -14C

COOLING LOAD

JUL 23 4PM  
 98F 37C  
 79F 26C

TIME  
 DRY-BULB TEMP  
 WET-BULB TEMP

|                      | SENSIBLE<br>(KBTU/H) | ( KW )     | LATENT<br>(KBTU/H) | ( KW )  | SENSIBLE<br>(KBTU/H) | ( KW )     |
|----------------------|----------------------|------------|--------------------|---------|----------------------|------------|
| WALLS                | 8.170                | 2.393      | 0.000              | 0.000   | -31.018              | -9.084     |
| ROOFS                | 12.808               | 3.751      | 0.000              | 0.000   | -32.144              | -9.414     |
| GLASS CONDUCTION     | 22.230               | 6.511      | 0.000              | 0.000   | -62.587              | -18.330    |
| GLASS SOLAR          | 9.508                | 2.785      | 0.000              | 0.000   | 0.436                | 0.128      |
| DOOR                 | 0.776                | 0.227      | 0.000              | 0.000   | -1.512               | -0.443     |
| INTERNAL SURFACES    | 0.000                | 0.000      | 0.000              | 0.000   | 0.000                | 0.000      |
| UNDERGROUND SURFACES | -0.824               | -0.241     | 0.000              | 0.000   | -2.636               | -0.772     |
| OCCUPANTS TO SPACE   | 6.543                | 1.916      | 9.375              | 2.746   | 0.188                | 0.055      |
| LIGHT TO SPACE       | 30.393               | 8.901      | 0.000              | 0.000   | 4.408                | 1.291      |
| EQUIPMENT TO SPACE   | 0.000                | 0.000      | 0.000              | 0.000   | 0.000                | 0.000      |
| PROCESS TO SPACE     | 0.000                | 0.000      | 0.000              | 0.000   | 0.000                | 0.000      |
| INFILTRATION         | 12.063               | 3.533      | 17.769             | 5.204   | -57.812              | -16.932    |
| TOTAL                | 101.666              | 29.775     | 27.144             | 7.950   | -182.676             | -53.501    |
| TOTAL LOAD           | 128.810              | KBTU/H     | 37.725             | KW      | -182.676             | KBTU/H     |
| TOTAL LOAD / AREA    | 28.06                | BTU/H.SQFT | 88.469             | W /SQMT | 39.799               | BTU/H.SQFT |
|                      |                      |            |                    |         |                      | W /SQMT    |

\*\*\*\*\*  
 \* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR \*  
 \* ---- LOADS \*  
 \* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION \*  
 \* IN CONSIDERATION \*  
 \*\*\*\*\*

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 10:16:38 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AC-1 TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                   |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -132.870                    | 15                      | -8.F                 | -9.F                 | -321.525                                | 7046.                     | 14.737                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -101.107                    | 3                       | -1.F                 | -2.F                 | -287.310                                | 6360.                     | 14.737                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -84.020                     | 3                       | 16.F                 | 13.F                 | -252.079                                | 7041.                     | 14.637                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -30.302                     | 5                       | 31.F                 | 28.F                 | -161.000                                | 6814.                     | 14.637                          |
| MAY   | 20.62210                    | 31                      | 16                   | 88.F                 | 75.F                                    | -6.965                      | 5                       | 44.F                 | 40.F                 | -106.771                                | 9025.                     | 34.720                          |
| JUN   | 64.83260                    | 19                      | 10                   | 82.F                 | 74.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 13111.                    | 38.743                          |
| JUL   | 92.03951                    | 24                      | 10                   | 80.F                 | 75.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 15954.                    | 42.044                          |
| AUG   | 89.48664                    | 21                      | 10                   | 86.F                 | 76.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 16048.                    | 40.818                          |
| SEP   | 38.51266                    | 6                       | 16                   | 93.F                 | 76.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 10579.                    | 39.252                          |
| OCT   | 0.16323                     | 1                       | 17                   | 85.F                 | 68.F                                    | -26.102                     | 20                      | 24.F                 | 23.F                 | -167.285                                | 7059.                     | 20.972                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -66.373                     | 2                       | 15.F                 | 14.F                 | -217.994                                | 6814.                     | 14.637                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -120.204                    | 15                      | 8.F                  | 7.F                  | -290.509                                | 7041.                     | 14.737                          |
| TOTAL | 305.657                     |                         |                      |                      |   | -567.944                    |                         |                      |                      | -321.525                                | 112900.                   | 42.044                          |
| MAX   |                             |                         |                      |                      | 284.550                                 |                             |                         |                      |                      |   |                           |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 10:16:38 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AC-1 TOPEKA, KS

| MONTH  | N U M B E R O F          |                          |                            |                   | H O U R S                  |                            |                              |                             | C O I N C I D E N T    |                              |  |  | L O A D S  |  |  |  |
|--------|--------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------------------|-----------------------------|------------------------|------------------------------|--|--|--|--|--|--|
|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>FANS ON<br>VENTING | HOURS<br>NIGHT<br>WHEN | HOURS<br>FLOATING<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0                        | 744                      | 0                          | 0                 | 744                        | 0                          | 744                          | 0                           | 0                      | 0                            | -159.635   | 4.543  | -159.635   | 4.543  | -159.635   | 4.543  |
| FEB    | 0                        | 672                      | 0                          | 0                 | 672                        | 0                          | 672                          | 0                           | 0                      | 0                            | -157.478   | 4.543  | -157.478   | 4.543  | -157.478   | 4.543  |
| MAR    | 0                        | 736                      | 0                          | 0                 | 744                        | 0                          | 744                          | 0                           | 0                      | 0                            | -158.809   | 4.543  | -158.809   | 4.543  | -158.809   | 4.543  |
| APR    | 0                        | 602                      | 0                          | 118               | 720                        | 0                          | 720                          | 0                           | 0                      | 118                          | -56.766  | 4.543  | -56.766  | 4.543  | -56.766  | 4.543  |
| MAY    | 291                      | 257                      | 0                          | 196               | 360                        | 293                        | 744                          | 0                           | 0                      | 196                          | 0.000  | 34.720   | 0.000  | 34.720   | 0.000  | 34.720   |
| JUN    | 651                      | 0                        | 0                          | 69                | 0                          | 651                        | 720                          | 0                           | 0                      | 69                           | 0.000  | 38.743   | 0.000  | 38.743   | 0.000  | 38.743   |
| JUL    | 740                      | 0                        | 0                          | 4                 | 0                          | 740                        | 744                          | 0                           | 0                      | 4                            | 0.000  | 39.366   | 0.000  | 39.366   | 0.000  | 39.366   |
| AUG    | 733                      | 0                        | 0                          | 11                | 0                          | 733                        | 744                          | 0                           | 0                      | 11                           | 0.000  | 40.818   | 0.000  | 40.818   | 0.000  | 40.818   |
| SEP    | 452                      | 0                        | 0                          | 268               | 0                          | 455                        | 720                          | 0                           | 0                      | 268                          | 0.000  | 39.252   | 0.000  | 39.252   | 0.000  | 39.252   |
| OCT    | 4                        | 569                      | 0                          | 171               | 720                        | 4                          | 744                          | 0                           | 0                      | 171                          | 0.000  | 20.972   | 0.000  | 20.972   | 0.000  | 20.972   |
| NOV    | 0                        | 687                      | 0                          | 33                | 720                        | 0                          | 744                          | 0                           | 0                      | 33                           | -180.423   | 4.543  | -180.423   | 4.543  | -180.423   | 4.543  |
| DEC    | 0                        | 744                      | 0                          | 0                 | 744                        | 0                          | 744                          | 0                           | 0                      | 0                            | -178.018   | 4.543  | -178.018   | 4.543  | -178.018   | 4.543  |
| ANNUAL | 2871                     | 5011                     | 0                          | 878               | 5424                       | 2876                       | 8760                         | 0                           | 0                      | 878                          |  |  |  |  |  |  |

EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 10:16:38 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|-----|--|---|---|
| JAN | 29.557<br>184.608<br>405.590                     | 57.754<br>28/ 9<br>15/ 3                            | 145.332<br>369.390<br>3/ 6                          |
| FEB | 26.637<br>57.754<br>29.002                       | 57.754<br>3/ 8<br>57.413                            | 125.834<br>331.368<br>3/ 4                          |
| MAR | 31/17<br>25.781<br>57.413                        | 57.413<br>17/ 8<br>31.553                           | 49.913<br>229.553<br>5/ 6                           |
| APR | 31.553<br>118.549<br>44.766                      | 118.549<br>31/16<br>44.766                          | 12.528<br>166.524<br>5/ 5                           |
| MAY | 44.766<br>132.286<br>19/10                       | 132.286<br>19/10<br>54.473                          | 0.000<br>0.000<br>30/ 1                             |
| JUN | 54.473<br>143.556<br>23/16                       | 143.556<br>23/16<br>54.794                          | 0.000<br>0.000<br>31/ 1                             |
| JUL | 54.794<br>139.370<br>21/10                       | 139.370<br>21/10<br>36.121                          | 0.000<br>0.000<br>31/ 1                             |
| AUG | 36.121<br>134.024<br>6/16                        | 134.024<br>6/16<br>26.460                           | 0.000<br>0.000<br>44.078                            |
| SEP | 26.460<br>71.608<br>1/17                         | 71.608<br>1/17<br>27.506                            | 236.742<br>20/ 6<br>101.395                         |
| OCT | 27.506<br>57.413<br>30/17                        | 57.413<br>30/17<br>29.494                           | 293.859<br>2/ 6<br>170.162                          |
| NOV | 29.494<br>57.754<br>13/ 8                        | 57.754<br>13/ 8<br>416.143                          | 372.805<br>15/ 5<br>833.850                         |
| DEC | ONE YEAR<br>USE/PEAK                             | 143.556   | 405.590   |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 10:16:38 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 29.19       | 833.85      |
| SPACE COOL                                       | 102.39      | 0.00        |
| HVAC AUX   | 137.38      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 147.18      | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 0.00        | 0.00        |
| TOTAL  | 416.14      | 833.85      |

TOTAL SITE ENERGY 1249.99 MBTU 272.3 KBTU/SQFT-YR GROSS-AREA 272.3 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2083.53 MBTU 453.9 KBTU/SQFT-YR GROSS-AREA 453.9 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



MULTIPLIER = 8.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 2.5 WIDTH = 3.0 CONS = DOOR-WOD  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

EAST-WALL =E-W HEIGHT = 27.0 WIDTH = 46.0 CONS = EXWALL-1  
 AZIMUTH = 76 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

SOUTH-WALL =E-W HEIGHT = 22.5 WIDTH = 70.0 CONS = EXWALL-1  
 AZIMUTH = 166 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 2.0 WIDTH = 5.0 G-T = 1\_PN\_STD  
 MULTIPLIER = 2.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 14.0 WIDTH = 4.0 G-T = 1\_PN\_STD  
 MULTIPLIER = 4.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 2.5 WIDTH = 3.0 CONS = DOOR-WOD  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 10.0 WIDTH = 459.0 CONS = FLOOR ..

ROOF HEIGHT = 25.0 WIDTH = 97.0 CONS = ROOF-1  
 AZIMUTH = 346 TILT = 21 SKY-FORM-FACTOR = 1.0 ..

ROOF HEIGHT = 35.0 WIDTH = 97.0 CONS = ROOF-1  
 AZIMUTH = 166 TILT = 21 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #1 NIGHT SETBACK FOR BLDG. 7086 \*  
 LINE-5 \*UNIT CHAPEL W/ SINGLE ZONE \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..

SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_W\_HT\_F =DAY-SCHEDULE (1,5) (55.)  
                                   (6,18) (74.)  
                                   (19,24) (55.) ..  
 SD\_S\_CL\_F =DAY-SCHEDULE (1,5) (85.)  
                                   (6,18) (72.)  
                                   (19,24) (85.) ..  
 SD\_W\_CL\_F =DAY-SCHEDULE (1,5) (56.)  
                                   (6,18) (75.)  
                                   (19,24) (56.) ..  
 SD\_S\_HT\_F =DAY-SCHEDULE (1,5) (84.)  
                                   (6,18) (71.)  
                                   (19,24) (84.) ..  
 SD\_FAN\_CYC =DAY-SCHEDULE (1,5) (0.)  
                                   (6,18) (1.)  
                                   (19,24) (0.) ..



SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..  
 SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..  
 SW\_W\_HT\_F =WEEK-SCHEDULE (ALL) SD\_W\_HT\_F ..  
 SW\_S\_CL\_F =WEEK-SCHEDULE (ALL) SD\_S\_CL\_F ..  
 SW\_W\_CL\_F =WEEK-SCHEDULE (ALL) SD\_W\_CL\_F ..  
 SW\_S\_HT\_F =WEEK-SCHEDULE (ALL) SD\_S\_HT\_F ..  
 SW\_FAN\_CYC =WEEK-SCHEDULE (ALL) SD\_FAN\_CYC ..

## \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
                                   THRU OCT 1 SW\_OFF  
                                   THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
                                   THRU OCT 1 SW\_ON  
                                   THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP



S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
 THRU OCT 1 SW\_S\_HT\_F  
 THRU DEC 31 SW\_W\_HT\_F ..

\$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
 THRU OCT 1 SW\_S\_CL\_F  
 THRU DEC 31 SW\_W\_CL\_F ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU AUG 20 SW\_OFF  
 THRU AUG 21 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYCL =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

\$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 1.0  
 ASSIGNED-CFM = 7700. SIZING-OPTION = FROM-LOADS ..

\$ SYSTEM DESCRIPTION

AC-1 =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED OA-CONTROL = FIXED  
 SUPPLY-CFM = 7700. RATED-CFM = 7700.  
 MIN-OUTSIDE-AIR = 0.23 MAX-OA-FRACTION = 0.23  
 FAN-SCHEDULE = S\_FAN\_CYCL SUPPLY-DELTA-T = 1.8  
 SUPPLY-KW = 0.00059 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY ←  
 NIGHT-VENT-DT = 0.0 COOLING-CAPACITY = 250250.  
 COOL-SH-CAP = 200200. COOL-FT-MIN = 0.  
 HEATING-CAPACITY = -423500. CRANKCASE-MAX-T = 0.  
 OUTSIDE-FAN-T = 45. HEAT-SOURCE = HOT-WATER  
 SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (SPACE\_1) ..

\$ HOURLY REPORT DESCRIPTION

ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = SPACE\_1  
 VARIABLE-LIST = (17,18,7,31) ..  
 AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = AC-1  
 VARIABLE-LIST = (3,5,6,17,39) ..  
 ZONE-RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONE-BLOCK)  
 ..  
 AHU-RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT



EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 10:56:33 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #1 NIGHT SETBACK FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- PS-B TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>26.645<br>59.640<br>28/ 9 | NATURAL-GAS<br>139.846<br>508.472<br>14/ 7 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 24.048<br>59.640<br>3/ 8                 | 107.565<br>472.442<br>3/ 8                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 27.094<br>59.299<br>31/17                | 92.532<br>451.300<br>3/ 6                  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 25.129<br>59.299<br>24/ 8                | 36.523<br>338.973<br>5/ 6                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 29.919<br>122.485<br>31/16               | 9.099<br>237.748<br>5/ 6                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 39.577<br>137.234<br>19/10               | 0.000<br>0.000<br>30/ 1                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 46.467<br>144.899<br>23/16               | 0.000<br>0.000<br>31/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 46.773<br>142.103<br>24/16               | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.342<br>137.223<br>6/16                | 0.000<br>0.000<br>30/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 25.800<br>71.644<br>1/17                 | 31.171<br>345.235<br>20/ 6                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 25.774<br>59.299<br>30/17                | 73.136<br>415.578<br>2/ 6                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 26.768<br>59.640<br>13/ 8                | 127.647<br>490.626<br>14/ 7                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |  |  |
|     | ONE YEAR<br>USE/PEAK                             | 377.336<br>144.899                       | 617.519<br>508.472                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 10:56:33 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 22.45       | 617.52      |
| SPACE COOL      | 77.03       | 0.00        |
| HVAC AUX        | 130.67      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 147.18      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 0.00        | 0.00        |
| TOTAL           | 377.34      | 617.52      |

TOTAL SITE ENERGY 994.86 MBTU 216.7 KBTU/SQFT-YR GROSS-AREA 216.7 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1750.66 MBTU 381.4 KBTU/SQFT-YR GROSS-AREA 381.4 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.7  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

MULTIPLIER = 8.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 2.5 WIDTH = 3.0 CONS = DOOR-WOD  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

EAST-WALL =E-W HEIGHT = 27.0 WIDTH = 46.0 CONS = EXWALL-1  
 AZIMUTH = 76 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

SOUTH-WALL =E-W HEIGHT = 22.5 WIDTH = 70.0 CONS = EXWALL-1  
 AZIMUTH = 166 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 2.0 WIDTH = 5.0 G-T = 1\_PN\_STD  
 MULTIPLIER = 2.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 14.0 WIDTH = 4.0 G-T = 1\_PN\_STD  
 MULTIPLIER = 4.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 2.5 WIDTH = 3.0 CONS = DOOR-WOD  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 10.0 WIDTH = 459.0 CONS = FLOOR ..

ROOF HEIGHT = 25.0 WIDTH = 97.0 CONS = ROOF-1  
 AZIMUTH = 346 TILT = 21 SKY-FORM-FACTOR = 1.0 ..

ROOF HEIGHT = 35.0 WIDTH = 97.0 CONS = ROOF-1  
 AZIMUTH = 166 TILT = 21 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #2 DDC CONTROL FOR BLDG. 7086 \*

LINE-5 \*UNIT CHAPEL W/ SINGLE ZONE \* ..

ABORT ERRORS ..

DIAGNOSTIC WARNINGS ..

SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

|            |               |        |       |    |
|------------|---------------|--------|-------|----|
| SD_ON      | =DAY-SCHEDULE | (1,24) | (1.)  | .. |
| SD_OFF     | =DAY-SCHEDULE | (1,24) | (0.)  | .. |
| SD_W_HT_F  | =DAY-SCHEDULE | (1,24) | (70.) | .. |
| SD_S_CL_F  | =DAY-SCHEDULE | (1,24) | (76.) | .. |
| SD_W_CL_F  | =DAY-SCHEDULE | (1,24) | (71.) | .. |
| SD_S_HT_F  | =DAY-SCHEDULE | (1,24) | (75.) | .. |
| SD_FAN_CYC | =DAY-SCHEDULE | (1,24) | (1.)  | .. |

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..  
 SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..  
 SW\_W\_HT\_F =WEEK-SCHEDULE (ALL) SD\_W\_HT\_F ..  
 SW\_S\_CL\_F =WEEK-SCHEDULE (ALL) SD\_S\_CL\_F ..  
 SW\_W\_CL\_F =WEEK-SCHEDULE (ALL) SD\_W\_CL\_F ..  
 SW\_S\_HT\_F =WEEK-SCHEDULE (ALL) SD\_S\_HT\_F ..  
 SW\_FAN\_CYC =WEEK-SCHEDULE (ALL) SD\_FAN\_CYC ..

## \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
 THRU OCT 1 SW\_S\_HT\_F  
 THRU DEC 31 SW\_W\_HT\_F ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
 THRU OCT 1 SW\_S\_CL\_F  
 THRU DEC 31 SW\_W\_CL\_F ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF

THRU JAN 15 SW\_ON  
 THRU AUG 20 SW\_OFF  
 THRU AUG 21 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYCL = SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

# \$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 1.0  
 ASSIGNED-CFM = 7700. SIZING-OPTION = FROM-LOADS ..

# \$ SYSTEM DESCRIPTION

AC-1 =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED OA-CONTROL = FIXED  
 SUPPLY-CFM = 7700. RATED-CFM = 7700.  
 MIN-OUTSIDE-AIR = 0.23 MAX-OA-FRACTION = 0.23  
 FAN-SCHEDULE = S\_FAN\_CYCL SUPPLY-DELTA-T = 1.8  
 SUPPLY-KW = 0.00059 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  
 NIGHT-VENT-DT = 0.0 COOLING-CAPACITY = 250250.  
 COOL-SH-CAP = 200200. COOL-FT-MIN = 0.  
 HEATING-CAPACITY = -423500. CRANKCASE-MAX-T = 0.  
 OUTSIDE-FAN-T = 45. HEAT-SOURCE = HOT-WATER  
 SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (SPACE\_1) ..

# \$ HOURLY REPORT DESCRIPTION

ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = SPACE\_1  
 VARIABLE-LIST = (17,18,7,31) ..  
 AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = AC-1  
 VARIABLE-LIST = (3,5,6,17,39) ..  
 ZONE-RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONE-BLOCK)  
 ..  
 AHU-RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (AHU-BLOCK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$EZ - DOE PLANTS INPUT \$

EMC ENGINEERS INC. EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 11: 3:20 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AC-1 TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -119.890                    | 15                      | 3                    | -8.F                 | -9.F                                    | 7046.                              | 14.737                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -89.335                     | 3                       | 6                    | -1.F                 | -2.F                                    | 6360.                              | 14.737                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -70.990                     | 3                       | 5                    | 15.F                 | 13.F                                    | 7041.                              | 14.637                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -21.139                     | 5                       | 6                    | 31.F                 | 28.F                                    | 6814.                              | 14.637                          |
| MAY   | 12.98170                    | 31                      | 16                   | 88.F                 | 75.F                                    | -3.949                      | 5                       | 5                    | 44.F                 | 40.F                                    | 8330.                              | 31.996                          |
| JUN   | 47.83162                    | 19                      | 10                   | 82.F                 | 74.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 11539.                             | 35.921                          |
| JUL   | 72.38590                    | 24                      | 10                   | 80.F                 | 75.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 14144.                             | 40.290                          |
| AUG   | 71.82764                    | 21                      | 10                   | 86.F                 | 76.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 14371.                             | 39.195                          |
| SEP   | 25.89304                    | 6                       | 16                   | 93.F                 | 76.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 9405.                              | 36.601                          |
| OCT   | 0.00000                     |                         |                      |                      | 0.000                                   | -17.225                     | 20                      | 6                    | 24.F                 | 23.F                                    | 7041.                              | 14.637                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -54.678                     | 2                       | 6                    | 15.F                 | 14.F                                    | 6814.                              | 14.637                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -107.118                    | 15                      | 5                    | 8.F                  | 7.F                                     | 7041.                              | 14.737                          |
| TOTAL | 230.920                     |                         |                      |                      |   | -484.324                    |                         |                      |                      |   | 105956.                            |                                 |
| MAX   |                             |                         |                      |                      | 253.064                                 |                             |                         |                      |                      | -305.106                                |                                    | 40.290                          |

EMC ENGINEERS INC. EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 11: 3:20 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AC-1 TOPEKA, KS

| MONTH  | HOURS           |                 |                   |          | HOURS             |                   |                   |         | HOURS             |                   |         |                  | COINCIDENT LOADS--          |   |   |  |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|-------------------|---------|-------------------|-------------------|---------|------------------|-----------------------------|---|---|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | COOLING<br>AVAIL. | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | COOLING<br>AVAIL. | HEATING<br>AVAIL. | FANS ON | NIGHT<br>VENTING | FLOATING<br>WHEN<br>FANS ON | LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0               | 744             | 0                 | 0        | 744               | 744               | 0                 | 744     | 0                 | 0                 | 0       | 0                | 0                           | -142.073                                | 0                                       | 4.543  |
| FEB    | 0               | 672             | 0                 | 0        | 672               | 672               | 0                 | 672     | 0                 | 0                 | 0       | 0                | 0                           | -140.183                                | 0                                       | 4.543  |
| MAR    | 0               | 722             | 0                 | 22       | 744               | 744               | 0                 | 744     | 0                 | 0                 | 22      | 0                | 22                          | -141.020                                | 0                                       | 4.543  |
| APR    | 0               | 541             | 0                 | 179      | 720               | 720               | 0                 | 720     | 0                 | 0                 | 179     | 0                | 179                         | -29.727                                 | 0                                       | 4.543  |
| MAY    | 209             | 232             | 0                 | 303      | 360               | 360               | 212               | 744     | 0                 | 0                 | 303     | 0                | 303                         | 0.000                                   | 0                                       | 31.996   |
| JUN    | 563             | 0               | 0                 | 157      | 0                 | 0                 | 565               | 720     | 0                 | 0                 | 157     | 0                | 157                         | 0.000                                   | 0                                       | 35.921   |
| JUL    | 723             | 0               | 0                 | 21       | 0                 | 0                 | 724               | 744     | 0                 | 0                 | 21      | 0                | 21                          | 0.000                                   | 0                                       | 37.187   |
| AUG    | 699             | 0               | 0                 | 45       | 0                 | 0                 | 699               | 744     | 0                 | 0                 | 45      | 0                | 45                          | 0.000                                   | 0                                       | 39.195   |
| SEP    | 363             | 0               | 0                 | 357      | 0                 | 0                 | 364               | 720     | 0                 | 0                 | 357     | 0                | 357                         | 0.000                                   | 0                                       | 36.601   |
| OCT    | 0               | 525             | 0                 | 219      | 720               | 720               | 0                 | 744     | 0                 | 0                 | 219     | 0                | 219                         | -98.292                                 | 0                                       | 4.543  |
| NOV    | 0               | 668             | 0                 | 52       | 720               | 720               | 0                 | 720     | 0                 | 0                 | 52      | 0                | 52                          | -163.318                                | 0                                       | 4.543  |
| DEC    | 0               | 744             | 0                 | 0        | 744               | 744               | 0                 | 744     | 0                 | 0                 | 0       | 0                | 0                           | -161.851                                | 0                                       | 4.543  |
| ANNUAL | 2557            | 4848            | 0                 | 1355     | 5424              | 5424              | 2564              | 8760    | 0                 | 0                 | 1355    |                  |                             |   |   |  |



EMC ENGINEERS INC. 80227 EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 11: 3:20 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #2 DDC CONTROL FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- PS-B TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|-----|--|---|---|
| JAN | 29.223<br>57.374<br>28/ 9                        | 167.779<br>384.878<br>15/ 3                         |   |
| FEB | 26.320<br>57.374<br>3/ 8                         | 129.912<br>348.410<br>3/ 6                          |   |
| MAR | 28.431<br>57.033<br>31/13                        | 107.509<br>307.580<br>3/ 5                          |   |
| APR | 25.108<br>57.033<br>17/ 7                        | 35.460<br>206.921<br>5/ 6                           |   |
| MAY | 28.909<br>109.249<br>31/16                       | 7.495<br>142.750<br>5/ 5                            |   |
| JUN | 39.400<br>122.649<br>19/10                       | 0.000<br>0.000<br>30/ 1                             |   |
| JUL | 48.295<br>137.568<br>23/16                       | 0.000<br>0.000<br>31/ 1                             |   |
| AUG | 49.068<br>133.827<br>21/10                       | 0.000<br>0.000<br>31/ 1                             |   |
| SEP | 32.114<br>124.972<br>6/16                        | 0.000<br>0.000<br>30/ 1                             |   |
| OCT | 25.694<br>57.033<br>31/10                        | 29.830<br>215.840<br>20/ 6                          |   |
| NOV | 26.903<br>57.033<br>30/17                        | 84.435<br>272.289<br>2/ 6                           |   |
| DEC | 29.125<br>57.374<br>13/ 8                        | 152.984<br>350.167<br>15/ 5                         |   |
|     | ONE YEAR<br>USE/PEAK                             | 388.590<br>137.568                                  | 715.404<br>384.878                                  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 11: 3:20 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 25.47       | 715.40      |
| SPACE COOL      | 78.68       | 0.00        |
| HVAC AUX        | 137.25      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 147.18      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 0.00        | 0.00        |
| TOTAL           | 388.59      | 715.40      |

TOTAL SITE ENERGY 1103.99 MBTU 240.5 KBTU/SQFT-YR GROSS-AREA 240.5 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1882.34 MBTU 410.1 KBTU/SQFT-YR GROSS-AREA 410.1 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

MULTIPLIER = 8.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 2.5 WIDTH = 3.0 CONS = DOOR-WOD  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

EAST-WALL =E-W HEIGHT = 27.0 WIDTH = 46.0 CONS = EXWALL-1  
 AZIMUTH = 76 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

SOUTH-WALL =E-W HEIGHT = 22.5 WIDTH = 70.0 CONS = EXWALL-1  
 AZIMUTH = 166 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 2.0 WIDTH = 5.0 G-T = 1\_PN\_STD  
 MULTIPLIER = 2.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 14.0 WIDTH = 4.0 G-T = 1\_PN\_STD  
 MULTIPLIER = 4.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 2.5 WIDTH = 3.0 CONS = DOOR-WOD  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 10.0 WIDTH = 459.0 CONS = FLOOR ..

ROOF HEIGHT = 25.0 WIDTH = 97.0 CONS = ROOF-1  
 AZIMUTH = 346 TILT = 21 SKY-FORM-FACTOR = 1.0 ..

ROOF HEIGHT = 35.0 WIDTH = 97.0 CONS = ROOF-1  
 AZIMUTH = 166 TILT = 21 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #3 ECONOMIZER FOR BLDG. 7086 \*  
 LINE-5 \*UNIT CHAPEL W/ SINGLE ZONE \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..

SYSTEMS-REPORT VERIFICATION={SV-A}  
 SUMMARY={SS-A,SS-C,SS-K,SS-O}  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_W\_HT\_F =DAY-SCHEDULE (1,5) (55.)  
           (6,18) (74.)  
           (19,24) (55.) ..  
 SD\_S\_CL\_F =DAY-SCHEDULE (1,5) (85.)  
           (6,18) (72.)  
           (19,24) (85.) ..  
 SD\_W\_CL\_F =DAY-SCHEDULE (1,5) (56.)  
           (6,18) (75.)  
           (19,24) (56.) ..  
 SD\_S\_HT\_F =DAY-SCHEDULE (1,5) (84.)  
           (6,18) (71.)  
           (19,24) (84.) ..  
 SD\_FAN\_CYC =DAY-SCHEDULE (1,5) (0.)  
           (6,18) (1.)  
           (19,24) (0.) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..  
 SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..  
 SW\_W\_HT\_F =WEEK-SCHEDULE (ALL) SD\_W\_HT\_F ..  
 SW\_S\_CL\_F =WEEK-SCHEDULE (ALL) SD\_S\_CL\_F ..  
 SW\_W\_CL\_F =WEEK-SCHEDULE (ALL) SD\_W\_CL\_F ..  
 SW\_S\_HT\_F =WEEK-SCHEDULE (ALL) SD\_S\_HT\_F ..  
 SW\_FAN\_CYC =WEEK-SCHEDULE (ALL) SD\_FAN\_CYC ..

\$ FULL ON SYSTEM  
 S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

\$ FULL OFF SYSTEM  
 S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

\$ HEATING SEASON  
 S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
           THRU OCT 1 SW\_OFF  
           THRU DEC 31 SW\_ON ..

\$ COOLING SEASON  
 S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
           THRU OCT 1 SW\_ON  
           THRU DEC 31 SW\_OFF ..

\$ HEATING SET TEMP

```
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_W_HT_F
              THRU OCT  1 SW_S_HT_F
              THRU DEC 31 SW_W_HT_F ..
```

## \$ COOLING SET TEMP

```
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_W_CL_F
              THRU OCT  1 SW_S_CL_F
              THRU DEC 31 SW_W_CL_F ..
```

```
S_HRLY-RPT =SCHEDULE THRU JAN 14 SW_OFF
              THRU JAN 15 SW_ON
              THRU AUG 20 SW_OFF
              THRU AUG 21 SW_ON
              THRU DEC 31 SW_OFF ..
```

```
S_FAN_CYCL =SCHEDULE THRU DEC 31 SW_FAN_CYC ..
```

## \$ ZONE DESCRIPTION

```
SPACE_1      =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
                  HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
                  ZONE-TYPE = CONDITIONED
                  THERMOSTAT-TYPE = PROPORTIONAL  THROTTLING-RANGE = 1.0
                  ASSIGNED-CFM = 7700.  SIZING-OPTION = FROM-LOADS ..
```

## \$ SYSTEM DESCRIPTION

```
AC-1          =SYSTEM  SYSTEM-TYPE = PSZ
                  MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
                  HEATING-SCHEDULE = S_HE-SCHED
                  COOLING-SCHEDULE = S_CL_SCHED  ECONO-LIMIT-T = 70.0
                  SUPPLY-CFM = 7700.  RATED-CFM = 7700.
                  MIN-OUTSIDE-AIR = 0.23  FAN-SCHEDULE = S_FAN_CYCL
                  SUPPLY-DELTA-T = 1.8  SUPPLY-KW = 0.00059
                  NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  NIGHT-VENT-DT = 0.0
                  COOLING-CAPACITY = 250250.  COOL-SH-CAP = 200200.
                  COOL-FT-MIN = 0.  HEATING-CAPACITY = -423500.
                  CRANKCASE-MAX-T = 0.  OUTSIDE-FAN-T = 45.
                  HEAT-SOURCE = HOT-WATER  SIZING-OPTION = COINCIDENT
                  ZONE-NAMES = (SPACE_1) ..
```

## \$ HOURLY REPORT DESCRIPTION

```
ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = SPACE_1
                  VARIABLE-LIST = (17,18,7,31) ..
AHU-BLOCK  =REPORT-BLOCK VARIABLE-TYPE = AC-1
                  VARIABLE-LIST = (3,5,6,17,39) ..
ZONE-RPT   = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                  REPORT-BLOCK = (ZONE-BLOCK)
..
AHU-RPT    = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                  REPORT-BLOCK = (AHU-BLOCK)
```

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 11:35: 2 SDL RUN 1 |                             |                         |                      |                      |                         |   |                             |                      |                      |       |          |   |                                    |                                 |
|--|-----------------------------|-------------------------|----------------------|----------------------|-------------------------|---|-----------------------------|----------------------|----------------------|-------|----------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE                   |                             |                         |                      |                      |                         |   |                             |                      |                      |       |          |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AC-1 TOPEKA, KS                                  |                             |                         |                      |                      |                         |   |                             |                      |                      |       |          |   |                                    |                                 |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | C O O L I N G           |                      |                      |                         | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | H E A T I N G        |                      |       |          | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
|  |                             | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | TIME<br>OF MAX<br>DY HR |   |                             | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |       |          |   |                                    |                                 |
| JAN  | 0.00000                     |                         |                      |                      | 0.000                   | -97.675                                 | 14                          | 8                    | -2. F                | -3. F | -402.941 | 6373.                                   | 14.737                             |                                 |
| FEB  | 0.00000                     |                         |                      |                      | 0.000                   | -72.940                                 | 3                           | 8                    | -2. F                | -3. F | -369.569 | 5792.                                   | 14.737                             |                                 |
| MAR  | 0.00000                     |                         |                      |                      | 0.000                   | -61.474                                 | 3                           | 6                    | 15. F                | 12. F | -340.113 | 6709.                                   | 14.637                             |                                 |
| APR  | 0.00000                     |                         |                      |                      | 0.000                   | -24.809                                 | 5                           | 6                    | 31. F                | 28. F | -255.449 | 6768.                                   | 14.637                             |                                 |
| MAY  | 14.15590                    | 31 16                   | 88. F                | 75. F                | 202.995                 | -6.659                                  | 5                           | 6                    | 44. F                | 40. F | -188.239 | 8412.                                   | 35.873                             |                                 |
| JUN  | 46.32540                    | 19 10                   | 82. F                | 74. F                | 293.534                 | 0.000                                   |                             |                      |                      |       | 0.000    | 11314.                                  | 40.192                             |                                 |
| JUL  | 67.40615                    | 24 10                   | 80. F                | 75. F                | 322.057                 | 0.000                                   |                             |                      |                      |       | 0.000    | 13508.                                  | 42.437                             |                                 |
| AUG  | 65.74354                    | 21 9                    | 83. F                | 75. F                | 322.721                 | 0.000                                   |                             |                      |                      |       | 0.000    | 13568.                                  | 41.618                             |                                 |
| SEP  | 28.14796                    | 5 10                    | 75. F                | 72. F                | 251.477                 | 0.000                                   |                             |                      |                      |       | 0.000    | 9562.                                   | 40.189                             |                                 |
| OCT  | 0.15025                     | 1 17                    | 85. F                | 68. F                | 58.482                  | -22.059                                 | 20                          | 6                    | 24. F                | 23. F | -259.822 | 7044.                                   | 21.317                             |                                 |
| NOV  | 0.00000                     |                         |                      |                      | 0.000                   | -48.462                                 | 2                           | 6                    | 15. F                | 14. F | -318.706 | 6537.                                   | 14.637                             |                                 |
| DEC  | 0.00000                     |                         |                      |                      | 0.000                   | -87.574                                 | 14                          | 8                    | 9. F                 | 7. F  | -383.646 | 6423.                                   | 14.737                             |                                 |
| TOTAL  | 221.929                     |                         |                      |                      |                         | -421.651                                |                             |                      |                      |       |          | 102022.                                 |                                    |                                 |
| MAX  |                             |                         |                      |                      | 322.721                 |   |                             |                      |                      |       | -402.941 |   | 42.437                             |                                 |

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 11:35: 2 SDL RUN 1 |                          |                          |  |             |     |           |                            |                              |                           |                                      |  |  |
|--|--------------------------|--------------------------|--|-------------|-----|-----------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE                   |                          |                          |  |             |     |           |                            |                              |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AC-1 TOPEKA, KS                                     |                          |                          |  |             |     |           |                            |                              |                           |                                      |  |  |
| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | N U M B E R | O F | H O U R S | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | --COINCIDENT LOADS--<br>HEATING LOAD AT<br>COOLING PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN  | 0                        | 525                      | 0  | 219         |     | 744       | 0                          | 596                          | 193                       | 0                                    | -4.940   | 4.543  |
| FEB  | 0                        | 465                      | 0  | 207         |     | 672       | 0                          | 547                          | 183                       | 0                                    | 0.000  | 0.000  |
| MAR  | 0                        | 474                      | 0  | 270         |     | 744       | 0                          | 671                          | 268                       | 0                                    | 0.000  | 0.000  |
| APR  | 0                        | 352                      | 0  | 368         |     | 720       | 0                          | 710                          | 320                       | 0                                    | 0.000  | 4.543  |
| MAY  | 141                      | 142                      | 0  | 461         |     | 360       | 183                        | 744                          | 341                       | 0                                    | 0.000  | 35.873   |
| JUN  | 332                      | 0                        | 0  | 388         |     | 0         | 371                        | 720                          | 330                       | 0                                    | 0.000  | 40.192   |
| JUL  | 395                      | 0                        | 0  | 349         |     | 0         | 404                        | 743                          | 340                       | 0                                    | 0.000  | 40.182   |
| AUG  | 387                      | 0                        | 0  | 357         |     | 0         | 409                        | 738                          | 335                       | 0                                    | 0.000  | 40.337   |
| SEP  | 249                      | 0                        | 0  | 471         |     | 0         | 272                        | 720                          | 330                       | 0                                    | 0.000  | 36.783   |
| OCT  | 3                        | 302                      | 0  | 439         |     | 720       | 3                          | 741                          | 338                       | 0                                    | 0.000  | 21.317   |
| NOV  | 0                        | 437                      | 0  | 283         |     | 720       | 0                          | 659                          | 269                       | 0                                    | -28.505  | 4.543  |
| DEC  | 0                        | 512                      | 0  | 232         |     | 744       | 0                          | 608                          | 205                       | 0                                    | 0.000  | 0.000  |
| ANNUAL   | 1507                     | 3209                     | 0  | 4044        |     | 5424      | 1642                       | 8197                         | 3452                      | 0                                    |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 11:35: 2 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY -<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>26.160<br>59.637<br>28/ 9 | NATURAL-GAS<br>137.949<br>508.293<br>14/ 8 |
|-----|---|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 26.160<br>59.637<br>28/ 9                | 137.949<br>508.293<br>14/ 8                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 23.484<br>59.637<br>3/ 8                 | 105.767<br>473.062<br>3/ 8                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 26.546<br>59.296<br>31/17                | 92.137<br>441.515<br>3/ 6                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 25.026<br>59.296<br>30/ 8                | 39.989<br>348.480<br>5/ 6                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 29.343<br>122.485<br>31/16               | 11.398<br>272.136<br>5/ 6                  |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 38.630<br>137.234<br>19/10               | 0.000<br>0.000<br>30/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 46.124<br>144.899<br>23/16               | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 46.327<br>142.103<br>24/16               | 0.000<br>0.000<br>31/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 32.648<br>137.223<br>6/16                | 0.000<br>0.000<br>30/ 1                    |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 25.816<br>72.785<br>1/17                 | 35.860<br>353.371<br>20/ 6                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 25.401<br>59.296<br>30/17                | 73.977<br>418.321<br>2/ 6                  |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 26.148<br>59.637<br>13/ 8                | 125.424<br>487.989<br>14/ 8                |
|     | ONE YEAR<br>USE/PEAK                              | 371.652<br>144.899                       | 622.502<br>508.293                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 11:35: 2 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 22.14       | 622.50      |
| SPACE COOL      | 73.98       | 0.00        |
| HVAC AUX        | 128.35      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 147.18      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 0.00        | 0.00        |
| TOTAL           | 371.65      | 622.50      |

TOTAL SITE ENERGY 994.15 MBTU 216.6 KBTU/SQFT-YR GROSS-AREA 216.6 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1738.57 MBTU 378.8 KBTU/SQFT-YR GROSS-AREA 378.8 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 17.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



MULTIPLIER = 8.0 SETBACK = 0.5

SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 2.5 WIDTH = 3.0 CONS = DOOR-WOD

MULTIPLIER = 2.0 SETBACK = 0.2

SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

EAST-WALL =E-W HEIGHT = 27.0 WIDTH = 46.0 'CONS = EXWALL-1

AZIMUTH = 76 SKY-FORM-FACTOR = 0.5

GND-FORM-FACTOR = 0.5 ..

SOUTH-WALL =E-W HEIGHT = 22.5 WIDTH = 70.0 CONS = EXWALL-1

AZIMUTH = 166 SKY-FORM-FACTOR = 0.5

GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 2.0 WIDTH = 5.0 G-T = 1\_PN\_STD

MULTIPLIER = 2.0 SETBACK = 0.5

SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 14.0 WIDTH = 4.0 G-T = 1\_PN\_STD

MULTIPLIER = 4.0 SETBACK = 0.5

SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 2.5 WIDTH = 3.0 CONS = DOOR-WOD

MULTIPLIER = 2.0 SETBACK = 0.2

SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 10.0 WIDTH = 459.0 CONS = FLOOR ..

ROOF HEIGHT = 25.0 WIDTH = 97.0 CONS = ROOF-1

AZIMUTH = 346 TILT = 21 SKY-FORM-FACTOR = 1.0 ..

ROOF HEIGHT = 35.0 WIDTH = 97.0 CONS = ROOF-1

AZIMUTH = 166 TILT = 21 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

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$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

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## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

```

LINE-4 \*RUN #4 NIGHT INFILTRATION FOR BLDG. 7086\*

LINE-5 \*UNIT CHAPEL W/ SINGLE ZONE \* ..

ABORT ERRORS ..

DIAGNOSTIC WARNINGS ..

SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_W\_HT\_F =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_S\_CL\_F =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_W\_CL\_F =DAY-SCHEDULE (1,24) (75.) ..  
 SD\_S\_HT\_F =DAY-SCHEDULE (1,24) (71.) ..  
 SD\_OA% =DAY-SCHEDULE (1,5) (0.)  
           (6,18) (0.23)  
           (19,24) (0.) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..  
 SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..  
 SW\_W\_HT\_F =WEEK-SCHEDULE (ALL) SD\_W\_HT\_F ..  
 SW\_S\_CL\_F =WEEK-SCHEDULE (ALL) SD\_S\_CL\_F ..  
 SW\_W\_CL\_F =WEEK-SCHEDULE (ALL) SD\_W\_CL\_F ..  
 SW\_S\_HT\_F =WEEK-SCHEDULE (ALL) SD\_S\_HT\_F ..  
 SW\_OA% =WEEK-SCHEDULE (ALL) SD\_OA% ..

## \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
                   THRU OCT 1 SW\_OFF  
                   THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
                   THRU OCT 1 SW\_ON  
                   THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
                   THRU OCT 1 SW\_S\_HT\_F  
                   THRU DEC 31 SW\_W\_HT\_F ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
                   THRU OCT 1 SW\_S\_CL\_F  
                   THRU DEC 31 SW\_W\_CL\_F ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU AUG 20 SW\_OFF  
 THRU AUG 21 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

# \$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 1.0  
 ASSIGNED-CFM = 7700. SIZING-OPTION = FROM-LOADS ..

# \$ SYSTEM DESCRIPTION

AC-1 =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED OA-CONTROL = FIXED  
 SUPPLY-CFM = 7700. RATED-CFM = 7700.  
MIN-AIR-SCH = S\_OA% MAX-OA-FRACTION = 0.23 ←  
 SUPPLY-DELTA-T = 1.8 SUPPLY-KW = 0.00059  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 COOLING-CAPACITY = 250250. COOL-SH-CAP = 200200.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -423500.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (SPACE\_1) ..

# \$ HOURLY REPORT DESCRIPTION

ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = SPACE\_1  
 VARIABLE-LIST = (17,18,7,31) ..  
 AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = AC-1  
 VARIABLE-LIST = (3,5,6,17,39) ..  
 ZONE-RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONE-BLOCK)  
 ..  
 AHU-RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (AHU-BLOCK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 11:42: 8 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |                                    |   |                                  |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|------------------------------------|---|----------------------------------|
| DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. 7086UNIT CHAPEL W/ SINGLE ZONE            |                             |                         |                      |                      |                             |                         |                      |                      |                                    |   |                                  |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AC-1 TOPEKA, KS                                  |                             |                         |                      |                      |                             |                         |                      |                      |                                    |   |                                  |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>MAXIMUM<br>LOAD<br>(KW) |
| JAN  | 0.00000                     |                         |                      |                      | -99.116                     | 14                      | 9                    | -4.F                 | 7046.                              | -306.658                                | 14.737                           |
| FEB  | 0.00000                     |                         |                      |                      | -74.045                     | 3                       | 6                    | -2.F                 | 6360.                              | -290.389                                | 14.737                           |
| MAR  | 0.00000                     |                         |                      |                      | -59.125                     | 3                       | 6                    | 15.F                 | 7041.                              | -246.903                                | 14.637                           |
| APR  | 0.00000                     |                         |                      |                      | -18.280                     | 5                       | 6                    | 31.F                 | 6814.                              | -161.694                                | 14.637                           |
| MAY  | 21.13025                    | 31                      | 16                   | 88.F                 | -3.358                      | 5                       | 6                    | 44.F                 | 9063.                              | -106.547                                | 34.710                           |
| JUN  | 57.72066                    | 19                      | 10                   | 82.F                 | 0.000                       |                         |                      |                      | 12484.                             | 0.000                                   | 38.728                           |
| JUL  | 77.85484                    | 24                      | 10                   | 80.F                 | 0.000                       |                         |                      |                      | 14700.                             | 0.000                                   | 42.040                           |
| AUG  | 77.04541                    | 21                      | 10                   | 86.F                 | 0.000                       |                         |                      |                      | 14899.                             | 0.000                                   | 40.807                           |
| SEP  | 36.90620                    | 6                       | 16                   | 93.F                 | 0.000                       |                         |                      |                      | 10437.                             | 0.000                                   | 39.244                           |
| OCT  | 0.26216                     | 1                       | 17                   | 85.F                 | -14.655                     | 20                      | 6                    | 24.F                 | 7070.                              | -167.903                                | 22.587                           |
| NOV  | 0.00000                     |                         |                      |                      | -44.617                     | 2                       | 6                    | 15.F                 | 6814.                              | -219.556                                | 14.637                           |
| DEC  | 0.00000                     |                         |                      |                      | -89.226                     | 12                      | 6                    | 3.F                  | 7041.                              | -280.344                                | 14.737                           |
| TOTAL  | 270.920                     |                         |                      |                      | -402.422                    |                         |                      |                      | 109778.                            | -306.658                                | 42.040                           |
| MAX  |                             |                         |                      |                      |                             |                         |                      |                      |                                    |   |                                  |

H8-38

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 11:42: 8 SDL RUN 1 |                          |                          |  |                           |      |      |      |                           |                           |                                      |  |  |
|--|--------------------------|--------------------------|--|---------------------------|------|------|------|---------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. 7086UNIT CHAPEL W/ SINGLE ZONE            |                          |                          |  |                           |      |      |      |                           |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AC-1 TOPEKA, KS                                     |                          |                          |  |                           |      |      |      |                           |                           |                                      |  |  |
| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | N U M B E R O F H O U R S |      |      |      | HOURS<br>FANS<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | --COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN  | 0                        | 744                      | 0  | 0                         | 744  | 0    | 744  | 0                         | 0                         | 0                                    | -77.699  | 4.543  |
| FEB  | 0                        | 672                      | 0  | 0                         | 672  | 0    | 672  | 0                         | 0                         | 0                                    | -73.898  | 4.543  |
| MAR  | 0                        | 735                      | 0  | 9                         | 744  | 0    | 744  | 0                         | 0                         | 9                                    | -77.167  | 4.543  |
| APR  | 0                        | 578                      | 0  | 142                       | 720  | 0    | 720  | 0                         | 0                         | 142                                  | -2.556   | 4.543  |
| MAY  | 343                      | 228                      | 0  | 173                       | 360  | 343  | 744  | 0                         | 0                         | 173                                  | 0.000  | 34.710   |
| JUN  | 691                      | 0                        | 0  | 29                        | 0    | 692  | 720  | 0                         | 0                         | 29                                   | 0.000  | 38.728   |
| JUL  | 742                      | 0                        | 0  | 2                         | 0    | 742  | 744  | 0                         | 0                         | 2                                    | 0.000  | 39.349   |
| AUG  | 738                      | 0                        | 0  | 6                         | 0    | 738  | 744  | 0                         | 0                         | 6                                    | 0.000  | 40.807   |
| SEP  | 537                      | 0                        | 0  | 183                       | 0    | 537  | 720  | 0                         | 0                         | 183                                  | 0.000  | 39.244   |
| OCT  | 7                        | 546                      | 0  | 191                       | 720  | 7    | 744  | 0                         | 0                         | 191                                  | 0.000  | 22.587   |
| NOV  | 0                        | 682                      | 0  | 38                        | 0    | 0    | 720  | 0                         | 0                         | 38                                   | -86.117  | 4.543  |
| DEC  | 0                        | 744                      | 0  | 0                         | 744  | 0    | 744  | 0                         | 0                         | 0                                    | -88.817  | 4.543  |
| ANNUAL   | 3058                     | 4929                     | 0  | 773                       | 5424 | 3059 | 8760 | 0                         | 0                         | 773                                  |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 11:42: 8 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. 7086UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>29.200<br>57.410<br>28/ 9 | NATURAL-GAS<br>143.880<br>386.836<br>14/ 9 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 26.286<br>57.410<br>3/ 8                 | 111.939<br>369.708<br>3/ 6                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 28.261<br>57.069<br>31/17                | 92.772<br>323.095<br>3/ 6                  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 24.989<br>57.069<br>17/ 8                | 31.537<br>228.242<br>5/ 6                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 31.356<br>118.514<br>31/16               | 6.497<br>164.372<br>5/ 6                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.625<br>132.234<br>19/10               | 0.000<br>0.000<br>30/ 1                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 50.190<br>143.543<br>23/16               | 0.000<br>0.000<br>31/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 50.873<br>139.334<br>21/10               | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 35.638<br>133.995<br>6/16                | 0.000<br>0.000<br>30/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 25.606<br>77.123<br>1/17                 | 25.877<br>235.311<br>20/ 6                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 26.719<br>57.069<br>30/17                | 71.684<br>293.160<br>2/ 6                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 29.082<br>57.410<br>13/ 8                | 132.082<br>359.049<br>12/ 6                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 400.826<br>143.543                       | 616.267<br>386.836                         |
|     | ONE YEAR<br>USE/PEAK                             |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 11:42: 8 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. 7086UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 24.63       | 616.27      |
| SPACE COOL      | 91.74       | 0.00        |
| HVAC AUX        | 137.29      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 147.18      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 0.00        | 0.00        |
| TOTAL           | 400.83      | 616.27      |

TOTAL SITE ENERGY 1017.09 MBTU 221.6 KBTU/SQFT-YR GROSS-AREA 221.6 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1819.95 MBTU 396.5 KBTU/SQFT-YR GROSS-AREA 396.5 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

MULTIPLIER = 8.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 2.5 WIDTH = 3.0 CONS = DOOR-WOD  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

EAST-WALL =E-W HEIGHT = 27.0 WIDTH = 46.0 CONS = EXWALL-1  
 AZIMUTH = 76 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

SOUTH-WALL =E-W HEIGHT = 22.5 WIDTH = 70.0 CONS = EXWALL-1  
 AZIMUTH = 166 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 2.0 WIDTH = 5.0 G-T = 1\_PN\_STD  
 MULTIPLIER = 2.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 14.0 WIDTH = 4.0 G-T = 1\_PN\_STD  
 MULTIPLIER = 4.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 2.5 WIDTH = 3.0 CONS = DOOR-WOD  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 10.0 WIDTH = 459.0 CONS = FLOOR ..

ROOF HEIGHT = 25.0 WIDTH = 97.0 CONS = ROOF-1  
 AZIMUTH = 346 TILT = 21 SKY-FORM-FACTOR = 1.0 ..

ROOF HEIGHT = 35.0 WIDTH = 97.0 CONS = ROOF-1  
 AZIMUTH = 166 TILT = 21 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 -----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #5 DAY INFILTRATION FOR BLDG. 7086 \*  
 LINE-5 \*UNIT CHAPEL W/ SINGLE ZONE \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..

SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_W\_HT\_F =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_S\_CL\_F =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_W\_CL\_F =DAY-SCHEDULE (1,24) (75.) ..  
 SD\_S\_HT\_F =DAY-SCHEDULE (1,24) (71.) ..  
 SD\_OA% =DAY-SCHEDULE (1,5) (0.23)  
                                   (6,18) (0.)  
                                   (19,24) (0.23) ..



SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..  
 SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..  
 SW\_W\_HT\_F =WEEK-SCHEDULE (ALL) SD\_W\_HT\_F ..  
 SW\_S\_CL\_F =WEEK-SCHEDULE (ALL) SD\_S\_CL\_F ..  
 SW\_W\_CL\_F =WEEK-SCHEDULE (ALL) SD\_W\_CL\_F ..  
 SW\_S\_HT\_F =WEEK-SCHEDULE (ALL) SD\_S\_HT\_F ..  
 SW\_OA% =WEEK-SCHEDULE (ALL) SD\_OA% ..

## \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
                                   THRU OCT 1 SW\_OFF  
                                   THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
                                   THRU OCT 1 SW\_ON  
                                   THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
                                   THRU OCT 1 SW\_S\_HT\_F  
                                   THRU DEC 31 SW\_W\_HT\_F ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
                                   THRU OCT 1 SW\_S\_CL\_F  
                                   THRU DEC 31 SW\_W\_CL\_F ..




S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU AUG 20 SW\_OFF  
 THRU AUG 21 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

# \$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 1.0  
 ASSIGNED-CFM = 7700. SIZING-OPTION = FROM-LOADS ..

# \$ SYSTEM DESCRIPTION

AC-1 =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED OA-CONTROL = FIXED  
 SUPPLY-CFM = 7700. RATED-CFM = 7700.  
MIN-AIR-SCH = S\_OA% MAX-OA-FRACTION = 0.23   
 SUPPLY-DELTA-T = 1.8 SUPPLY-KW = 0.00059  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 COOLING-CAPACITY = 250250. COOL-SH-CAP = 200200.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -423500.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (SPACE\_1) ..

# \$ HOURLY REPORT DESCRIPTION

ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = SPACE\_1  
 VARIABLE-LIST = (17,18,7,31) ..  
 AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = AC-1  
 VARIABLE-LIST = (3,5,6,17,39) ..  
 ZONE-RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONE-BLOCK)  
 ..  
 AHU-RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (AHU-BLOCK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 11:48:32 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AC-1 TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -96.077                     | 15                      | -8.F                 | -9.F                 | -320.839                                | 7046.                              | 14.737                          |
| FEB   | 0.00000                     |                         |                      |                      | -72.493                     | 3                       | 0.F                  | -1.F                 | -282.860                                | 6360.                              | 14.737                          |
| MAR   | 0.00000                     |                         |                      |                      | -59.877                     | 3                       | 16.F                 | 13.F                 | -251.793                                | 7041.                              | 14.637                          |
| APR   | 0.00000                     |                         |                      |                      | -20.235                     | 5                       | 31.F                 | 29.F                 | -159.951                                | 6814.                              | 14.637                          |
| MAY   | 18.61114                    | 22 10                   | 75.F                 | 63.F                 | -4.182                      | 5                       | 44.F                 | 40.F                 | -106.311                                | 8832.                              | 30.983                          |
| JUN   | 51.07773                    | 19 10                   | 82.F                 | 74.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 11811.                             | 35.460                          |
| JUL   | 70.71615                    | 24 10                   | 80.F                 | 75.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 13956.                             | 35.938                          |
| AUG   | 68.61514                    | 21 10                   | 86.F                 | 76.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 14010.                             | 36.968                          |
| SEP   | 32.96278                    | 5 10                    | 75.F                 | 72.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 10053.                             | 32.629                          |
| OCT   | 0.13247                     | 1 19                    | 81.F                 | 66.F                 | -16.526                     | 20                      | 25.F                 | 25.F                 | -162.348                                | 7056.                              | 18.804                          |
| NOV   | 0.00000                     |                         |                      |                      | -46.232                     | 2                       | 16.F                 | 15.F                 | -216.154                                | 6814.                              | 14.637                          |
| DEC   | 0.00000                     |                         |                      |                      | -86.653                     | 15                      | 8.F                  | 7.F                  | -290.107                                | 7041.                              | 14.737                          |
| TOTAL | 242.115                     |                         |                      |                      | -402.276                    |                         |                      |                      |   | 106843.                            |                                 |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      | -320.839                                |                                    | 36.968                          |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 11:48:32 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AC-1 TOPEKA, KS

| MONTH  | H O U R S       |                 |                   |          | H O U R S         |                   |                  |                    | C O I N C I D E N T |                   |  |  | C O I N C I D E N T                                |  |  |  |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|------------------|--------------------|---------------------|-------------------|--|--|--|--|--|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON<br>CYCLE | FANS ON<br>VENTING | HOURS<br>NIGHT      | HOURS<br>FLOATING | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0               | 743             | 0                 | 1        | 744               | 0                 | 0                | 0                  | 0                   | 1                 | -159.229   | 4.543  | -159.229   | 4.543  | -159.229   | 4.543  |
| FEB    | 0               | 671             | 0                 | 1        | 672               | 0                 | 0                | 0                  | 0                   | 1                 | -157.144   | 4.543  | -157.144   | 4.543  | -157.144   | 4.543  |
| MAR    | 0               | 705             | 0                 | 39       | 744               | 0                 | 0                | 0                  | 0                   | 39                | -158.433   | 4.543  | -158.433   | 4.543  | -158.433   | 4.543  |
| APR    | 0               | 498             | 0                 | 222      | 720               | 0                 | 0                | 0                  | 0                   | 222               | -43.554  | 4.543  | -43.554  | 4.543  | -43.554  | 4.543  |
| MAY    | 306             | 208             | 0                 | 230      | 360               | 312               | 0                | 0                  | 0                   | 230               | 0.000  | 30.983   | 0.000  | 30.983   | 0.000  | 30.983   |
| JUN    | 658             | 0               | 0                 | 62       | 0                 | 664               | 0                | 0                  | 0                   | 62                | 0.000  | 35.460   | 0.000  | 35.460   | 0.000  | 35.460   |
| JUL    | 741             | 0               | 0                 | 3        | 0                 | 741               | 0                | 0                  | 0                   | 3                 | 0.000  | 35.938   | 0.000  | 35.938   | 0.000  | 35.938   |
| AUG    | 737             | 0               | 0                 | 7        | 0                 | 737               | 0                | 0                  | 0                   | 7                 | 0.000  | 36.968   | 0.000  | 36.968   | 0.000  | 36.968   |
| SEP    | 491             | 0               | 0                 | 229      | 720               | 494               | 0                | 0                  | 0                   | 229               | 0.000  | 32.629   | 0.000  | 32.629   | 0.000  | 32.629   |
| OCT    | 4               | 472             | 0                 | 268      | 720               | 5                 | 0                | 0                  | 0                   | 268               | 0.000  | 8.503  | 0.000  | 8.503  | 0.000  | 8.503  |
| NOV    | 0               | 624             | 0                 | 96       | 720               | 0                 | 0                | 0                  | 0                   | 96                | -179.903   | 4.543  | -179.903   | 4.543  | -179.903   | 4.543  |
| DEC    | 0               | 742             | 0                 | 2        | 744               | 0                 | 0                | 0                  | 0                   | 2                 | -177.453   | 4.543  | -177.453   | 4.543  | -177.453   | 4.543  |
| ANNUAL | 2937            | 4663            | 0                 | 1160     | 5424              | 2953              | 0                | 0                  | 0                   | 1160              |  |  |  |  |  |  |

EMC ENGINEERS INC. EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 11:48:32 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|-----|--|---|---|
| JAN | 28.932<br>57.738<br>28/ 9                        | 138.833<br>404.724<br>15/ 3                         |   |
| FEB | 25.927<br>57.738<br>3/ 8                         | 108.134<br>364.498<br>3/ 4                          |   |
| MAR | 27.950<br>57.397<br>31/ 9                        | 91.976<br>330.934<br>3/ 4                           |   |
| APR | 25.029<br>56.332<br>5/ 7                         | 33.950<br>228.255<br>5/ 5                           |   |
| MAY | 30.630<br>105.788<br>22/10                       | 7.783<br>165.894<br>5/ 5                            |   |
| JUN | 40.329<br>121.074<br>19/10                       | 0.000<br>0.000<br>30/ 1                             |   |
| JUL | 47.652<br>122.707<br>24/10                       | 0.000<br>0.000<br>31/ 1                             |   |
| AUG | 47.837<br>126.223<br>21/10                       | 0.000<br>0.000<br>31/ 1                             |   |
| SEP | 34.326<br>111.410<br>5/10                        | 0.000<br>0.000<br>30/ 1                             |   |
| OCT | 25.659<br>64.204<br>1/17                         | 28.508<br>231.000<br>20/ 5                          |   |
| NOV | 26.436<br>57.397<br>30/ 8                        | 72.019<br>291.704<br>2/ 5                           |   |
| DEC | 28.782<br>57.738<br>13/ 8                        | 127.431<br>372.242<br>15/ 5                         |   |
|     | ONE YEAR<br>USE/PEAK                             | 389.490<br>126.223                                  | 608.634<br>404.724                                  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 11:48:32 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. 7086 UNIT CHAPEL W/ SINGLE ZONE  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

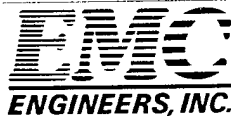
| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 23.32       | 608.63      |
| SPACE COOL                                       | 81.71       | 0.00        |
| HVAC AUX   | 137.26      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 147.17      | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 0.00        | 0.00        |
| TOTAL  | 389.47      | 608.63      |

TOTAL SITE ENERGY 998.12 MBTU 217.5 KBTU/SQFT-YR GROSS-AREA 217.5 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1778.27 MBTU 387.4 KBTU/SQFT-YR GROSS-AREA 387.4 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.1  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

**COMPUTER ENERGY SIMULATIONS**

**BLDG. 6**

**CHURCH BLOCK-TYPE BUILDINGS**



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

BUILDING NO.: 6  
BLDG. TYPE: POST CHAPEL

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

## ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1   | RUN2   | RUN3   | RUN4    | RUN5   |
|----------------|---------|--------|--------|--------|---------|--------|
| HEATING (MBtu) | 688.3   | 573.7  | 588.7  | 573.4  | 570.0   | 492.5  |
| COOLING (kWH)  | 103,844 | 97,556 | 97,477 | 94,281 | 101,717 | 97,401 |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 8,320 CFM                         |
| FLOOR AREA     | 5,780 FT²                         |
| CFM/F          | 1331 CFM                          |
| UA             | 2151 BTU/HR-°F                    |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

| EZDOE COMPUTER RUN DEFINITION: |                             |
|--------------------------------|-----------------------------|
| BASERUN                        | EXISTING OPERATION          |
| RUN1                           | NIGHT SETBACK               |
| RUN2                           | DDC CONTROL                 |
| RUN3                           | ECONOMIZER                  |
| RUN4                           | NIGHTTIME INFILTRATION (OA) |
| RUN5                           | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      |            | ANNUAL HEATING & COOLING HOURS |            |
|--------------------|-------------------|------|------------|--------------------------------|------------|
| M-F                | 800               | 1700 | 45 HR      | HR. ON HEATING                 | 2075 HR/YR |
| SAT.               | 1000              | 1700 | 7 HR       | HR. ON COOLING                 | 1262 HR/YR |
| SUN.               | 600               | 1800 | 12 HR      | HR. OFF HEATING                | 3373 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 64 HR/WK   | HR. OFF COOLING                | 2050 HR/YR |
|                    | TOTAL UNOCC. HR.  |      | 104 HR/WK  |                                |            |
|                    | ANNUAL OCCUPY HR. |      | 3337 HR/YR |                                |            |
|                    | ANNUAL UNOCC. HR. |      | 5423 HR/YR |                                |            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING

8760 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY

5448 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

3312 HR/YR

HRS SAVED (HTG ONLY) 5448 - 2075 = 3373 HR/YR

HRS SAVED (CLG ONLY) 3312 - 1262 = 2050 HR/YR

|           |   |   |               |           |                     |
|-----------|---|---|---------------|-----------|---------------------|
| HOAUHC    | 688.27 MBtu   | - | 569.95 MBtu   | =         | 1.64E+01 Btu/CFM-HR |
|           | 1331 CFM  | x | 5423 HR/YR    |           |                     |
| HOAUH     | 688.27 MBtu   | - | 569.95 MBtu   | =         | 2.64E+01 Btu/CFM-HR |
|           | 1331 CFM  | x | 3373 HR/YR    |           |                     |
| COAUHC    | 103,844.1 kWH   | - | 101,717.0 kWH | =         | 2.95E-04 kWH/CFM-HR |
|           | 1331 CFM  | x | 5423 HR/YR    |           |                     |
| COAUC     | 103,844.1 kWH   | - | 101,717.0 kWH | =         | 7.79E-04 kWH/CFM-HR |
|           | 1331 CFM  | x | 2050 HR/YR    |           |                     |
| HOAHC     | 688.27 MBtu   | - | 492.49 MBtu   | =         | 4.41E+01 Btu/CFM-HR |
|           | 1331 CFM  | x | 3337 HR/YR    |           |                     |
| HOAHC     | 688.27 MBtu   | - | 492.49 MBtu   | =         | 7.09E+01 Btu/CFM-HR |
|           | 1331 CFM  | x | 2075 HR/YR    |           |                     |
| COAHC     | 103,844.1 kWH   | - | 97,401.1 kWH  | =         | 1.45E-03 kWH/CFM-HR |
|           | 1331 CFM  | x | 3337 HR/YR    |           |                     |
| COAOC     | 103,844.1 kWH   | - | 97,401.1 kWH  | =         | 3.84E-03 kWH/CFM-HR |
|           | 1331 CFM  | x | 1262 HR/YR    |           |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | =         | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | =         | 0.17                |
| ECC       | 97,556.4 kWH  | - | 94,280.7 kWH  | =         | 3.12E-04 kWH/CFM-HR |
|           | 8320 CFM  | x | 1262 HR/YR    |           |                     |
| ECHC      | 97,556.4 kWH  | - | 94,280.7 kWH  | =         | 1.18E-04 kWH/CFM-HR |
|           | 8320 CFM  | x | 3337 HR/YR    |           |                     |
| NSUCHC    | 103,844.1 kWH   | - | 97,556.4 kWH  | =         | 1.39E-04 kWH/CFM-HR |
|           | 8320 CFM  | x | 5423 HR/YR    |           |                     |
| NSUCC     | 103,844.1 kWH   | - | 97,556.4 kWH  | =         | 3.69E-04 kWH/CFM-HR |
|           | 8320 CFM  | x | 2050 HR/YR    |           |                     |
| DDCCHC    | 103,844.1 kWH   | - | 97,477.3 kWH  | =         | 2.29E-04 kWH/CFM-HR |
|           | 8320 CFM  | x | 3337 HR/YR    |           |                     |
| DDCCC     | 103,844.1 kWH   | - | 97,477.3 kWH  | =         | 6.07E-04 kWH/CFM-HR |
|           | 8320 CFM  | x | 1262 HR/YR    |           |                     |
| NSC       | 688.27 MBtu   | - | 573.72 MBtu   | =         | 5.32E+04 Btu/UA     |
|           | 2151.24 UA  |   |               |           |                     |
| DDCH      | 688.27 MBtu   | - | 588.71 MBtu   | =         | 4.63E+04 Btu/UA     |
|           | 2151.24 UA  |   |               |           |                     |
| OPT       | (2 HR/DAY X 240 DAY/YR)                               |   |               | 175 HR/YR |                     |
|           |   |   |               | =         | 305 HR/YR           |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               | =         | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01          | =         | 5.67 HR/YR          |



INPUT LOADS ..

```

$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BLDG. #6      *
        LINE-5 *POST CHAPEL      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
LOADS-REPORT VERIFICATION=(LV-D)
            SUMMARY=(LS-C,LS-D)
            HOURLY-DATA-SAVE = YES ..
BUILDING-LOCATION LATITUDE = 39.0
                LONGITUDE = 96.5
                ALTITUDE = 1065.
                TIME-ZONE = 6
                GROSS-AREA = 5780
                SHIELDING-COEF = 0.29
                X-REF = 0.0
                Y-REF = 0.0 ..
RUN-PERIOD  JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

```

LD_ON      =DAY-SCHEDULE (1,24) (1.) ..
LD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
LD_SATWEDD =DAY-SCHEDULE (1,9) (0.)
                (10,12) (0.01)
                (13,17) (0.02,0.18,0.09,0.02,0.01)
                (18,24) (0.) ..
LD_WENS    =DAY-SCHEDULE (1,6) (0.)
                (7,17) (0.01)
                (18) (0.05)
                (19,20) (0.1)
                (21) (0.05)
                (22,24) (0.) ..
LD_SUNDAY  =DAY-SCHEDULE (1,5) (0.)
                (6) (0.01)
                (7,8) (0.2)
                (9,13) (0.3,0.5,1.,0.1,0.01)
                (14) (0.1)

```



```

!
(15,17) (0.)
(18) (0.12)
(19,20) (0.24)
(21) (0.12)
(22,24) (0.) ..

LD_WEEKDAY =DAY-SCHEDULE (1,6) (0.)
(7,16) (0.01)
(17,24) (0.) ..

LD_S-SCHOL =DAY-SCHEDULE (1,24) (0.) ..

LD_BASEMNT =DAY-SCHEDULE (1,7) (0.)
(8,16) (0.1)
(17,24) (0.) ..

LD_LITES =DAY-SCHEDULE (1,5) (0.)
(6) (0.2)
(7,20) (1.)
(21) (0.5)
(22,24) (0.) ..

LW_CHAPEL =WEEK-SCHEDULE (MON) LD_WEEKDAY
(TUE) LD_WEEKDAY
(WED) LD_WENS
(THU) LD_WEEKDAY
(FRI) LD_WEEKDAY
(SAT) LD_SATWEDD
(SUN) LD_SUNDAY
(HOL) LD_SUNDAY ..

LW_BASEMNT =WEEK-SCHEDULE (WD) LD_BASEMNT
(SAT) LD_SATWEDD
(SUN) LD_S-SCHOL
(HOL) LD_S-SCHOL ..

LW_LITES =WEEK-SCHEDULE (ALL) LD_LITES ..

LW_ON =WEEK-SCHEDULE (ALL) LD_ON ..

LW_OFF =WEEK-SCHEDULE (ALL) LD_OFF ..

$ ON 100% OF THE TIME
L_ON =SCHEDULE THRU DEC 31 LW_ON ..

$ OFF 100% OF THE TIME
L_OFF =SCHEDULE THRU DEC 31 LW_OFF ..

$ CHAPEL SCHEDULE
L_CHAPEL =SCHEDULE THRU DEC 31 LW_CHAPEL ..

$ BASEMENT SCHEDULE
L_S-SCHOOL =SCHEDULE THRU DEC 31 LW_BASEMNT ..

```

\$ LIGHTS SCHED

L\_LITES =SCHEDULE THRU DEC 31 LW\_LITES ..

## \$ CONSTRUCTION TYPES

## \$ 2"THICK STONE WALL

WALL-1 =LAYERS MATERIAL=(CC07,CC07,AL11,WD11) I-F-R= 0.6100  
THICKNESS=(1.000,1.000,0.000,0.063) ..EXWALL-1 =CONSTRUCTION LAYERS = WALL-1  
ABSORPTANCE = 0.880  
ROUGHNESS = 2 ..FLOOR =CONSTRUCTION U-VALUE = 0.020  
ABSORPTANCE = 0.610  
ROUGHNESS = 5 ..

## \$ SHINGLED ROOF

SHIN-ROF =LAYERS MATERIAL=(AR02,BP01,HF-B10,IN73,AL12,WD01)  
THICKNESS=(0.000,0.000,0.167,0.125,0.000,0.063) ..ROOF-1 =CONSTRUCTION LAYERS = SHIN-ROF  
ABSORPTANCE = 0.800  
ROUGHNESS = 1 ..

## \$ STANDARD WOOD DOOR

DOOR-STD =LAYERS MATERIAL=(WD12,WD12) I-F-R= 0.6100  
THICKNESS=(0.083,0.083) ..DOOR-WOD =CONSTRUCTION LAYERS = DOOR-STD  
ABSORPTANCE = 0.860  
ROUGHNESS = 5 ..1\_PN\_STD =GLASS-TYPE GLASS-TYPE-CODE = 2  
PANES = 1 ..

## \$ SPACE DESCRIPTION

UP-STAIRS =SPACE AREA = 2890.0 VOLUME = 83810.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_CHAPEL NUMBER-OF-PEOPLE = 250.0  
PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
LIGHTING-TYPE = INCAND LIGHTING-W/SQFT = 1.0  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITES  
SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 1.8  
INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.12  
INF-SCHEDULE = L\_ON ..E-W HEIGHT = 29.0 WIDTH = 37.0 CONS = EXWALL-1  
AZIMUTH = 45 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

```

WINDOW HEIGHT = 4.0  WIDTH = 2.5  G-T = 1_PN_STD
MULTIPLIER = 5.0  SETBACK = 0.5
SKY-FORM-FACTOR = 0.5  GND-FORM-FACTOR = 0.5  ..

DOOR  HEIGHT = 7.5  WIDTH = 3.0  CONS = DOOR-WOD
MULTIPLIER = 2.0  SETBACK = 0.2
SKY-FORM-FACTOR = 0.5  GND-FORM-FACTOR = 0.5  ..

DOOR  HEIGHT = 7.5  WIDTH = 3.0  CONS = DOOR-WOD
MULTIPLIER = 2.0  SETBACK = 0.2
SKY-FORM-FACTOR = 0.5  GND-FORM-FACTOR = 0.5  ..

E-W  HEIGHT = 18.0  WIDTH = 95.0  CONS = EXWALL-1
AZIMUTH = 135  SKY-FORM-FACTOR = 0.5
GND-FORM-FACTOR = 0.5  ..

WINDOW HEIGHT = 4.0  WIDTH = 2.5  G-T = 1_PN_STD
MULTIPLIER = 7.0  SETBACK = 0.5
SKY-FORM-FACTOR = 0.5  GND-FORM-FACTOR = 0.5  ..

DOOR  HEIGHT = 7.5  WIDTH = 3.0  CONS = DOOR-WOD
MULTIPLIER = 2.0  SETBACK = 0.2
SKY-FORM-FACTOR = 0.5  GND-FORM-FACTOR = 0.5  ..

DOOR  HEIGHT = 7.5  WIDTH = 3.0  CONS = DOOR-WOD
MULTIPLIER = 2.0  SETBACK = 0.2
SKY-FORM-FACTOR = 0.5  GND-FORM-FACTOR = 0.5  ..

E-W  HEIGHT = 29.0  WIDTH = 47.0  CONS = EXWALL-1
AZIMUTH = 225  SKY-FORM-FACTOR = 0.5
GND-FORM-FACTOR = 0.5  ..

WINDOW HEIGHT = 4.0  WIDTH = 2.5  G-T = 1_PN_STD
MULTIPLIER = 4.0  SETBACK = 0.5
SKY-FORM-FACTOR = 0.5  GND-FORM-FACTOR = 0.5  ..

E-W  HEIGHT = 18.0  WIDTH = 30.0  CONS = EXWALL-1
AZIMUTH = 315  SKY-FORM-FACTOR = 0.5
GND-FORM-FACTOR = 0.5  ..

WINDOW HEIGHT = 4.0  WIDTH = 2.5  G-T = 1_PN_STD
MULTIPLIER = 5.0  SETBACK = 0.5
SKY-FORM-FACTOR = 0.5  GND-FORM-FACTOR = 0.5  ..

WINDOW HEIGHT = 4.0  WIDTH = 2.5  G-T = 1_PN_STD
MULTIPLIER = 5.0  SETBACK = 0.5
SKY-FORM-FACTOR = 0.5  GND-FORM-FACTOR = 0.5  ..

ROOF  HEIGHT = 30.0  WIDTH = 95.0  CONS = ROOF-1
AZIMUTH = 135  TILT = 45  SKY-FORM-FACTOR = 1.0  ..

ROOF  HEIGHT = 30.0  WIDTH = 95.0  CONS = ROOF-1
AZIMUTH = 315  TILT = 45  SKY-FORM-FACTOR = 1.0  ..

BASEMENT  =SPACE  AREA = 2890.0  VOLUME = 28900.0

```

TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_S-SCHOOL NUMBER-OF-PEOPLE = 55.0  
PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
LIGHTING-TYPE = INCAND LIGHTING-W/SQFT = 1.0  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITES  
SOURCE-SENSIBLE = 0.0 FLOOR-WEIGHT = 130.  
FURN-WEIGHT = 0.5 INF-METHOD = AIR-CHANGE  
AIR-CHANGES/HR = 0.22 INF-SCHEDULE = L\_ON ..

E-W HEIGHT = 4.0 WIDTH = 37.0 CONS = EXWALL-1  
AZIMUTH = 45 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 3.0 WIDTH = 3.0 G-T = 1\_PN\_STD  
MULTIPLIER = 3.0 SETBACK = 0.5  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 4.0 WIDTH = 95.0 CONS = EXWALL-1  
AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 3.0 WIDTH = 3.0 G-T = 1\_PN\_STD  
MULTIPLIER = 7.0 SETBACK = 0.5  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 4.0 WIDTH = 47.0 CONS = EXWALL-1  
AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 3.0 WIDTH = 3.0 G-T = 1\_PN\_STD  
SETBACK = 0.5 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 3.0 WIDTH = 3.0 G-T = 1\_PN\_STD  
SETBACK = 0.5 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 4.0 WIDTH = 30.0 CONS = EXWALL-1  
AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 3.0 WIDTH = 3.0 G-T = 1\_PN\_STD  
MULTIPLIER = 6.0 SETBACK = 0.5  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 3.0 WIDTH = 3.0 G-T = 1\_PN\_STD  
MULTIPLIER = 6.0 SETBACK = 0.5  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 10.0 WIDTH = 289.0 CONS = FLOOR ..

U-W HEIGHT = 6.0 WIDTH = 209.0 CONS = FLOOR ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BLDG. #6      *
        LINE-5 *POST CHAPEL      * ..

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE  (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..
SD_WT_HT   =DAY-SCHEDULE  (1,24) (74.) ..
SD_SM_CL   =DAY-SCHEDULE  (1,24) (72.) ..
SD_WT_CL   =DAY-SCHEDULE  (1,24) (76.) ..
SD_SM_HT   =DAY-SCHEDULE  (1,24) (70.) ..
SD_OA%     =DAY-SCHEDULE  (1,24) (0.16) ..

SW_ON      =WEEK-SCHEDULE  (ALL) SD_ON ..

SW_OFF     =WEEK-SCHEDULE  (ALL) SD_OFF ..

SW_WT_HT   =WEEK-SCHEDULE  (ALL) SD_WT_HT ..

SW_SM_CL   =WEEK-SCHEDULE  (ALL) SD_SM_CL ..

SW_WT_CL   =WEEK-SCHEDULE  (ALL) SD_WT_CL ..

SW_SM_HT   =WEEK-SCHEDULE  (ALL) SD_SM_HT ..

SW_OA%     =WEEK-SCHEDULE  (ALL) SD_OA% ..

```

## \$ FULL ON SYSTEM

```

S_ON      =SCHEDULE THRU DEC 31 SW_ON ..

```

## \$ FULL OFF SYSTEM

```

S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..

```

## \$ HEATING SEASON

```

S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
            THRU OCT  1 SW_OFF

```

THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
THRU JAN 15 SW\_ON  
THRU AUG 20 SW\_OFF  
THRU AUG 21 SW\_ON  
THRU DEC 31 SW\_OFF ..

## \$ ZONE DESCRIPTION

UP-STAIRS =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 8000.  
SIZING-OPTION = FROM-LOADS ..

BASEMENT =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
BASEBOARD-CTRL = THERMOSTATIC  
SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

PACK-COOLU =SYSTEM SYSTEM-TYPE = PSZ  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE-SCHED  
COOLING-SCHEDULE = S\_CL\_SCHED OA-CONTROL = FIXED  
SUPPLY-CFM = 8000. RATED-CFM = 8000.  
MIN-AIR-SCH = S\_OA% SUPPLY-DELTA-T = 1.8  
SUPPLY-KW = 0.00059 NIGHT-CYCLE-CTRL = STAY-OFF  
NIGHT-VENT-DT = 0.0 COOLING-CAPACITY = 240000.  
COOL-SH-CAP = 180000. COOL-FT-MIN = 0.  
HEATING-CAPACITY = -800000. CRANKCASE-MAX-T = 0.  
OUTSIDE-FAN-T = 45. HEAT-SOURCE = HOT-WATER

BASEBOARD-SOURCE = HOT-WATER  
 SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (UP-STAIRS) ..

BB-RADIATN =SYSTEM SYSTEM-TYPE = FPH  
 HEATING-SCHEDULE = S\_HE-SCHED  
 ZONE-NAMES = (BASEMENT) ..

## \$ HOURLY REPORT DESCRIPTION

ZONE-UP-BK =REPORT-BLOCK VARIABLE-TYPE = UP-STAIRS  
 VARIABLE-LIST = (17,18,7,6) ..  
 ZONE-BS-BK =REPORT-BLOCK VARIABLE-TYPE = BASEMENT  
 VARIABLE-LIST = (17,18,7,6) ..  
 AHU-BLK =REPORT-BLOCK VARIABLE-TYPE = PACK-COOLU  
 VARIABLE-LIST = (3,5,6,17) ..  
 BB-BASE-BK =REPORT-BLOCK VARIABLE-TYPE = BB-RADIATN  
 VARIABLE-LIST = (7) ..  
 ZONES-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONE-UP-BK,ZONE-BS-BK)  
 ..  
 SYS-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (AHU-BLK,BB-BASE-BK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*BASELINE SIMULATION FOR BLDG. #6 \*  
 LINE-5 \*POST CHAPEL \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
 SUMMARY=(PS-B,BEPS)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 PD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

PW\_OFF =WEEK-SCHEDULE (ALL) PD\_OFF ..

PW\_ON =WEEK-SCHEDULE (ALL) PD\_ON ..

\$ HEATING SEASON

P\_HEAT =SCHEDULE THRU MAY 15 PW\_ON  
THRU OCT 1 PW\_OFF  
THRU DEC 31 PW\_ON ..

\$ COOLING SEASON

P\_COOL =SCHEDULE THRU MAY 15 PW\_OFF  
THRU OCT 1 PW\_ON  
THRU DEC 31 PW\_OFF ..

\$ EQUIPMENT DESCRIPTION

PRIM-BOILR =PLANT-EQUIPMENT TYPE = HW-BOILER  
SIZE = -999. ..

DX-COOLING =PLANT-EQUIPMENT TYPE = HERM-REC-CHLR  
SIZE = -999. INSTALLED-NUMBER = 2  
MAX-NUMBER-AVAIL = 2 ..

PLANT-PARAMETERS BOILER-FUEL = NATURAL-GAS TWR-PUMP-HEAD = 35.  
HERM-REC-COND-TYPE = AIR CCIRC-HEAD = 0.0 ..

ENERGY-RESOURCE RESOURCE = ELECTRICITY ..  
ENERGY-RESOURCE RESOURCE = NATURAL-GAS ..

HEAT-ASSIN =LOAD-ASSIGNMENT TYPE = HEATING  
OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = PRIM-BOILR  
NUMBER = 1 ..

COOL-ASSIN =LOAD-ASSIGNMENT TYPE = COOLING  
OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = DX-COOLING  
NUMBER = 2 ..

END ..  
COMPUTE PLANT ..  
STOP ..



|                    |   |                                  |           |           |
|--------------------|---|----------------------------------|-----------|-----------|
| EMC ENGINEERS INC. | EZDOE - ELITE SOFTWARE DEVELOPMENT INC      | DOE-2.1D                         | 5/11/1995 | LDL RUN 1 |
| DENVER, CO         | 80237                                       | BASELINE SIMULATION FOR BLDG. #6 |           |           |
| REPORT- LV-D       | DETAILS OF EXTERIOR SURFACES IN THE PROJECT | POST CHAPEL                      |           |           |
|                    |   | TOPEKA, KS                       |           |           |

| NUMBER OF EXTERIOR SURFACES   | 10 | RECTANGULAR | 10 | OTHER | 0 |
|---|----|-------------|----|-------|---|
| (U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED) |    |             |    |       |   |

| SURFACE | SPACE     | - - - G L A S S - - -      |                |                            |                | - - - W A L L - - -        |                |                            |                | - W A L L + G L A S S - |  |  |            | AZIMUTH |
|---------|-----------|----------------------------|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|----------------|-------------------------|--|--|------------|---------|
|         |           | U-VALUE<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) |                         |  |  |            |         |
|         | UP-STAIRS | 1.021                      | 50.00          | 0.198                      | 1023.00        | 0.236                      | 1073.00        |                            |                |                         |  |  | NORTH-EAST |         |
|         | BASEMENT  | 1.021                      | 27.00          | 0.198                      | 121.00         | 0.348                      | 148.00         |                            |                |                         |  |  | NORTH-EAST |         |
|         | UP-STAIRS | 1.021                      | 70.00          | 0.198                      | 1640.00        | 0.232                      | 1710.00        |                            |                |                         |  |  | SOUTH-EAST |         |
|         | BASEMENT  | 1.021                      | 63.00          | 0.198                      | 317.00         | 0.334                      | 380.00         |                            |                |                         |  |  | SOUTH-EAST |         |
|         | UP-STAIRS | 1.021                      | 40.00          | 0.198                      | 1323.00        | 0.222                      | 1363.00        |                            |                |                         |  |  | SOUTH-WEST |         |
|         | BASEMENT  | 1.021                      | 18.00          | 0.198                      | 170.00         | 0.277                      | 188.00         |                            |                |                         |  |  | SOUTH-WEST |         |
|         | UP-STAIRS | 1.021                      | 100.00         | 0.198                      | 440.00         | 0.350                      | 540.00         |                            |                |                         |  |  | NORTH-WEST |         |
|         | BASEMENT  | 1.021                      | 108.00         | 0.198                      | 12.00          | 0.939                      | 120.00         |                            |                |                         |  |  | NORTH-WEST |         |
|         | UP-STAIRS | 0.000                      | 0.00           | 0.103                      | 2850.00        | 0.103                      | 2850.00        |                            |                |                         |  |  | ROOF       |         |
|         | UP-STAIRS | 0.000                      | 0.00           | 0.103                      | 2850.00        | 0.103                      | 2850.00        |                            |                |                         |  |  | ROOF       |         |
|         | BASEMENT  | 0.000                      | 0.00           | 0.020                      | 2890.00        | 0.020                      | 2890.00        |                            |                |                         |  |  | UNDERGRND  |         |
|         | BASEMENT  | 0.000                      | 0.00           | 0.020                      | 1254.00        | 0.020                      | 1254.00        |                            |                |                         |  |  | UNDERGRND  |         |

-----  
 EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:10:18 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #6 POST CHAPEL  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS  
 -----

|             | AVERAGE<br>U-VALUE/GLASS<br>(BTU/HR-SQFT-F) | AVERAGE<br>U-VALUE/WALLS<br>(BTU/HR-SQFT-F) | AVERAGE U-VALUE<br>WALLS+GLASS<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | OPAQUE<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) |
|-------------|---|---|---|-------------------------|--------------------------|--------------------------------|
| NORTH-EAST  | 1.021                                       | 0.198                                       | 0.250   | 77.00                   | 1144.00                  | 1221.00                        |
| SOUTH-EAST  | 1.021                                       | 0.198                                       | 0.250   | 133.00                  | 1957.00                  | 2090.00                        |
| SOUTH-WEST  | 1.021                                       | 0.198                                       | 0.229   | 58.00                   | 1493.00                  | 1551.00                        |
| NORTH-WEST  | 1.021                                       | 0.198                                       | 0.457   | 208.00                  | 452.00                   | 660.00                         |
| ROOF        | 0.000                                       | 0.103                                       | 0.000   | 0.00                    | 5700.00                  | 5700.00                        |
| ALL WALLS   | 1.021                                       | 0.198                                       | 0.269   | 476.00                  | 5046.00                  | 5522.00                        |
| WALLS+ROOFS | 1.021                                       | 0.148                                       | 0.185   | 476.00                  | 10746.00                 | 11222.00                       |
| UNDERGRND   | 0.000                                       | 0.020                                       | 0.000   | 0.00                    | 4144.00                  | 4144.00                        |
| BUILDING    | 1.021                                       | 0.112                                       | 0.140   | 476.00                  | 14890.00                 | 15366.00                       |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:10:18 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #6 POST CHAPEL  
 REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS

\*\*\* BUILDING \*\*\*

FLOOR AREA 5780 SQFT 537 SQMT  
 VOLUME 112710 CUFT 3192 CUMT

HEATING LOAD  
 JAN 16 6AM  
 10F -12C  
 8F -13C

COOLING LOAD  
 AUG 21 11AM  
 88F 31C  
 76F 24C

TIME  
 DRY-BULB TEMP  
 WET-BULB TEMP

|                      | SENSIBLE<br>(KBTU/H) ( KW ) |            | LATENT<br>(KBTU/H) ( KW ) |         | HEATING LOAD<br>(KBTU/H) ( KW ) |            |
|----------------------|-----------------------------|------------|---------------------------|---------|---------------------------------|------------|
| WALLS                | 16.972                      | 4.971      | 0.000                     | 0.000   | -101.307                        | -29.670    |
| ROOFS                | 0.000                       | 0.000      | 0.000                     | 0.000   | 0.000                           | 0.000      |
| GLASS CONDUCTION     | 5.259                       | 1.540      | 0.000                     | 0.000   | -36.212                         | -10.606    |
| GLASS SOLAR          | 14.045                      | 4.114      | 0.000                     | 0.000   | 1.997                           | 0.585      |
| DOOR                 | 2.209                       | 0.647      | 0.000                     | 0.000   | -4.649                          | -1.362     |
| INTERNAL SURFACES    | 0.000                       | 0.000      | 0.000                     | 0.000   | 0.000                           | 0.000      |
| UNDERGROUND SURFACES | -0.392                      | -0.115     | 0.000                     | 0.000   | -2.380                          | -0.697     |
| OCCUPANTS TO SPACE   | 68.054                      | 19.931     | 156.250                   | 45.762  | 0.879                           | 0.258      |
| LIGHT TO SPACE       | 15.492                      | 4.537      | 0.000                     | 0.000   | 5.193                           | 1.521      |
| EQUIPMENT TO SPACE   | 0.000                       | 0.000      | 0.000                     | 0.000   | 0.000                           | 0.000      |
| PROCESS TO SPACE     | 0.000                       | 0.000      | 0.000                     | 0.000   | 0.000                           | 0.000      |
| INFILTRATION         | 4.875                       | 1.428      | 11.614                    | 3.401   | -28.961                         | -8.482     |
| TOTAL                | 126.515                     | 37.053     | 167.864                   | 49.163  | -165.439                        | -48.453    |
| TOTAL LOAD           | 294.378                     | KBTU/H     | 86.216                    | KW      | -165.439                        | KBTU/H     |
| TOTAL LOAD / AREA    | 50.93                       | BTU/H.SQFT | 160.557                   | W /SQMT | 28.623                          | BTU/H.SQFT |

\*\*\*\*\*  
 \* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR \*  
 \* LOADS \*  
 \* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION \*  
 \* IN CONSIDERATION \*  
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| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:10:18 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |  |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|--|
| DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #6 POST CHAPEL                                  |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |  |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR PACK-COOLU TOPEKA, KS                            |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |  |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----                                    |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |  |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | ELEC-<br>MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN  | 0.00000                     |                         |                      |                      | -101.250                    | 15                      | -8.F                 | -9.F                 | -226.381                                | 4833.                     | 7.709                                    |
| FEB  | 0.00000                     |                         |                      |                      | -77.103                     | 3                       | -1.F                 | -2.F                 | -206.208                                | 4361.                     | 7.709                                    |
| MAR  | 0.00000                     |                         |                      |                      | -63.287                     | 3                       | 15.F                 | 13.F                 | -168.434                                | 4828.                     | 7.609                                    |
| APR  | 0.00000                     |                         |                      |                      | -22.690                     | 1                       | 32.F                 | 29.F                 | -114.722                                | 4672.                     | 7.609                                    |
| MAY  | 17.28819                    | 30 11                   | 74.F                 | 69.F                 | -5.072                      | 5                       | 44.F                 | 40.F                 | -67.391                                 | 6501.                     | 28.622                                   |
| JUN  | 50.19612                    | 26 11                   | 82.F                 | 74.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 9575.                     | 32.869                                   |
| JUL  | 70.73447                    | 24 11                   | 82.F                 | 75.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 11714.                    | 33.058                                   |
| AUG  | 67.62566                    | 21 11                   | 88.F                 | 76.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 11666.                    | 34.029                                   |
| SEP  | 29.33169                    | 5 11                    | 78.F                 | 73.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 7566.                     | 31.256                                   |
| OCT  | 0.06924                     | 1 18                    | 83.F                 | 68.F                 | -20.052                     | 20                      | 23.F                 | 22.F                 | -115.936                                | 4836.                     | 10.437                                   |
| NOV  | 0.00000                     |                         |                      |                      | -51.497                     | 3                       | 13.F                 | 12.F                 | -152.258                                | 4672.                     | 7.609                                    |
| DEC  | 0.00000                     |                         |                      |                      | -91.736                     | 15                      | 3.F                  | 2.F                  | -209.624                                | 4828.                     | 7.709                                    |
| TOTAL  | 235.245                     |                         |                      |                      | -432.686                    |                         |                      |                      | -226.381                                | 80053.                    | 34.029                                   |
| MAX  |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |  |

H9-14

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:10:18 SDL RUN 1 |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
|--|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #6 POST CHAPEL                                  |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR PACK-COOLU TOPEKA, KS                               |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----  |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN  | 0                        | 744                      | 0  | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -122.937   | 4.720  |
| FEB  | 0                        | 672                      | 0  | 0                 | 672                        | 0                          | 672                          | 0                         | 0                                    | -113.051   | 4.720  |
| MAR  | 0                        | 743                      | 0  | 1                 | 744                        | 0                          | 744                          | 0                         | 1                                    | -113.902   | 4.720  |
| APR  | 0                        | 620                      | 0  | 100               | 720                        | 0                          | 720                          | 0                         | 100                                  | -33.413  | 4.720  |
| MAY  | 339                      | 254                      | 0  | 151               | 360                        | 342                        | 744                          | 0                         | 151                                  | 0.000  | 28.514   |
| JUN  | 683                      | 0                        | 0  | 37                | 0                          | 685                        | 720                          | 0                         | 37                                   | 0.000  | 32.762   |
| JUL  | 744                      | 0                        | 0  | 0                 | 0                          | 744                        | 744                          | 0                         | 0                                    | 0.000  | 33.058   |
| AUG  | 744                      | 0                        | 0  | 0                 | 0                          | 744                        | 744                          | 0                         | 0                                    | 0.000  | 34.029   |
| SEP  | 489                      | 0                        | 0  | 231               | 0                          | 493                        | 720                          | 0                         | 231                                  | 0.000  | 31.256   |
| OCT  | 4                        | 595                      | 0  | 145               | 720                        | 4                          | 744                          | 0                         | 145                                  | 0.000  | 10.437   |
| NOV  | 0                        | 710                      | 0  | 10                | 720                        | 0                          | 720                          | 0                         | 10                                   | -127.817   | 4.720  |
| DEC  | 0                        | 744                      | 0  | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -134.786   | 4.720  |
| ANNUAL   | 3003                     | 5082                     | 0  | 675               | 5424                       | 3012                       | 8760                         | 0                         | 675                                  |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:10:18 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #6 POST CHAPEL  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR BB-RADIATN TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                   |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -11.865                     | 4                       | 3                    | 8.F 7.F              | 1316.                     | 2.889                           |
| FEB   | 0.00000                     |                         |                      |                      | -8.782                      | 2                       | 3                    | 13.F 11.F            | 1189.                     | 2.889                           |
| MAR   | 0.00000                     |                         |                      |                      | -6.536                      | 3                       | 4                    | 16.F 13.F            | 1316.                     | 2.889                           |
| APR   | 0.00000                     |                         |                      |                      | -1.436                      | 1                       | 3                    | 36.F 32.F            | 1274.                     | 2.889                           |
| MAY   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 1316.                     | 2.889                           |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 1274.                     | 2.889                           |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 1316.                     | 2.889                           |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 1274.                     | 2.889                           |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 1316.                     | 2.889                           |
| OCT   | 0.00000                     |                         |                      |                      | -0.269                      | 31                      | 5                    | 45.F 40.F            | 1316.                     | 2.889                           |
| NOV   | 0.00000                     |                         |                      |                      | -3.923                      | 30                      | 5                    | 29.F 26.F            | 1274.                     | 2.889                           |
| DEC   | 0.00000                     |                         |                      |                      | -10.505                     | 15                      | 5                    | 8.F 7.F              | 1316.                     | 2.889                           |
| TOTAL | 0.000                       |                         |                      |                      | -43.315                     |                         |                      |                      | 15499.                    |                                 |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      | -34.457                   | 2.889                           |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:10:18 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #6 POST CHAPEL  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR BB-RADIATN TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |                            |                   |                            |                            |                     |                     |                     |                     | C O I N C I D E N T L O A D S                      |  |
|--------|---------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|---------------------|---------------------|---------------------|---------------------|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0                         | 744                      | 0                          | 0                 | 744                        | 744                        | 744                 | 0                   | 0                   | 0                   | -15.660  | 0.000  |
| FEB    | 0                         | 670                      | 0                          | 2                 | 672                        | 672                        | 672                 | 0                   | 0                   | 2                   | -13.959  | 0.000  |
| MAR    | 0                         | 680                      | 0                          | 64                | 744                        | 744                        | 744                 | 0                   | 0                   | 64                  | -14.686  | 0.000  |
| APR    | 0                         | 250                      | 0                          | 470               | 720                        | 720                        | 720                 | 0                   | 0                   | 470                 | 0.000  | 0.000  |
| MAY    | 0                         | 0                        | 0                          | 744               | 360                        | 744                        | 360                 | 0                   | 0                   | 360                 | 0.000  | 0.000  |
| JUN    | 0                         | 0                        | 0                          | 720               | 0                          | 720                        | 0                   | 0                   | 0                   | 0                   | 0.000  | 0.000  |
| JUL    | 0                         | 0                        | 0                          | 744               | 0                          | 744                        | 0                   | 0                   | 0                   | 0                   | 0.000  | 0.000  |
| AUG    | 0                         | 0                        | 0                          | 744               | 0                          | 744                        | 0                   | 0                   | 0                   | 0                   | 0.000  | 0.000  |
| SEP    | 0                         | 0                        | 0                          | 720               | 0                          | 744                        | 0                   | 0                   | 0                   | 0                   | 0.000  | 0.000  |
| OCT    | 0                         | 70                       | 0                          | 674               | 720                        | 744                        | 720                 | 0                   | 0                   | 650                 | -8.919   | 0.000  |
| NOV    | 0                         | 536                      | 0                          | 184               | 720                        | 720                        | 720                 | 0                   | 0                   | 184                 | -14.610  | 0.000  |
| DEC    | 0                         | 744                      | 0                          | 0                 | 744                        | 744                        | 744                 | 0                   | 0                   | 0                   | -16.786  | 0.000  |
| ANNUAL | 0                         | 3694                     | 0                          | 5066              | 5424                       | 8760                       | 5424                | 0                   | 0                   | 1730                |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:10:18 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #6 POST CHAPEL  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>25.860<br>42.729<br>28/ 9 | NATURAL-GAS<br>154.564<br>318.515<br>15/ 3 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 25.860<br>42.729<br>28/ 9                | 154.564<br>318.515<br>15/ 3                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 23.327<br>42.729<br>3/ 8                 | 121.305<br>295.812<br>3/ 6                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 25.555<br>42.388<br>31/20                | 103.601<br>257.215<br>3/ 5                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 22.760<br>42.388<br>17/ 8                | 39.389<br>183.397<br>1/ 1                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 27.413<br>107.592<br>22/11               | 8.984<br>110.518<br>5/ 6                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.042<br>122.092<br>19/11               | 0.000<br>0.000<br>30/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 44.491<br>122.739<br>24/11               | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 44.327<br>126.054<br>21/11               | 0.000<br>0.000<br>31/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 30.185<br>116.586<br>5/11                | 0.000<br>0.000<br>30/ 1                    |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 23.317<br>45.502<br>1/18                 | 34.208<br>167.475<br>20/ 8                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 24.303<br>42.388<br>30/20                | 83.896<br>226.136<br>2/ 6                  |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 25.836<br>42.729<br>13/ 8                | 142.320<br>303.714<br>15/ 5                |
|     | ONE YEAR<br>USE/PEAK                             | 354.417<br>126.054                       | 688.268<br>318.515                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:10:18 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #6 POST CHAPEL  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 23.39       | 688.27      |
| SPACE COOL                                       | 79.23       | 0.00        |
| HVAC AUX   | 145.95      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 105.85      | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 0.00        | 0.00        |
| TOTAL  | 354.42      | 688.27      |

TOTAL SITE ENERGY 1042.68 MBTU 180.4 KBTU/SQFT-YR GROSS-AREA 180.4 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1752.58 MBTU 303.2 KBTU/SQFT-YR GROSS-AREA 303.2 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



## INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

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## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

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        LINE-4 *RUN #1 NIGHT SETBACK BLDG. #6      *

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        LINE-5 *POST CHAPEL      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE  (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..
SD_WT_HT   =DAY-SCHEDULE  (1,5) (55.)
                (6,21) (74.)
                (22,24) (55.) ..
SD_SM_CL   =DAY-SCHEDULE  (1,5) (85.)
                (6,21) (72.)
                (22,24) (85.) ..
SD_WT_CL   =DAY-SCHEDULE  (1,5) (57.)
                (6,21) (76.)
                (22,24) (57.) ..
SD_SM_HT   =DAY-SCHEDULE  (1,5) (83.)
                (6,21) (70.)
                (22,24) (83.) ..
SD_OA%     =DAY-SCHEDULE  (1,24) (0.16) ..
SD_FAN_CYC =DAY-SCHEDULE  (1,5) (0.)
                (6,21) (1.)
                (22,24) (0.) ..

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SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..
SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..
SW_WT_HT   =WEEK-SCHEDULE (ALL) SD_WT_HT ..
SW_SM_CL   =WEEK-SCHEDULE (ALL) SD_SM_CL ..
SW_WT_CL   =WEEK-SCHEDULE (ALL) SD_WT_CL ..
SW_SM_HT   =WEEK-SCHEDULE (ALL) SD_SM_HT ..
SW_OA%     =WEEK-SCHEDULE (ALL) SD_OA% ..

```



SW\_FAN\_CYC =WEEK-SCHEDULE (ALL) SD\_FAN\_CYC ..

\$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

\$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

\$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
THRU OCT 1 SW\_OFF  
THRU DEC 31 SW\_ON ..

\$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

\$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

\$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
THRU JAN 15 SW\_ON  
THRU AUG 20 SW\_OFF  
THRU AUG 21 SW\_ON  
THRU DEC 31 SW\_OFF ..

S\_FAN\_CYCL =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

\$ ZONE DESCRIPTION

UP-STAIRS =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 8000.  
SIZING-OPTION = FROM-LOADS ..

BASEMENT =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
BASEBOARD-CTRL = THERMOSTATIC  
SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

PACK-COOLU =SYSTEM      SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0    MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED    OA-CONTROL = FIXED  
 SUPPLY-CFM = 8000.    RATED-CFM = 8000.  
 MIN-AIR-SCH = S\_OA%    FAN-SCHEDULE = S\_FAN\_CYCL  
 SUPPLY-DELTA-T = 1.8    SUPPLY-KW = 0.00059  
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY    NIGHT-VENT-DT = 0.0  
 COOLING-CAPACITY = 240000.    COOL-SH-CAP = 180000.  
 COOL-FT-MIN = 0.    HEATING-CAPACITY = -800000.  
 CRANKCASE-MAX-T = 0.    OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER  
 BASEBOARD-SOURCE = HOT-WATER  
 SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (UP-STAIRS) ..

BB-RADIATN =SYSTEM      SYSTEM-TYPE = FPH  
 HEATING-SCHEDULE = S\_HE-SCHED  
 ZONE-NAMES = (BASEMENT) ..

## \$ HOURLY REPORT DESCRIPTION

ZONE-UP-BK =REPORT-BLOCK VARIABLE-TYPE = UP-STAIRS  
                                  VARIABLE-LIST = (17,18,7,6) ..  
 ZONE-BS-BK =REPORT-BLOCK VARIABLE-TYPE = BASEMENT  
                                  VARIABLE-LIST = (17,18,7,6) ..  
 AHU-BLK    =REPORT-BLOCK VARIABLE-TYPE = PACK-COOLU  
                                  VARIABLE-LIST = (3,5,6,17) ..  
 BB-BASE-BK =REPORT-BLOCK VARIABLE-TYPE = BB-RADIATN  
                                  VARIABLE-LIST = (7) ..  
 ZONES-HRLY = HOURLY-REPORT    REPORT-SCHEDULE = S\_HRLY-RPT  
                                  REPORT-BLOCK = (ZONE-UP-BK,ZONE-BS-BK)  
 ..  
 SYS-HRLY    = HOURLY-REPORT    REPORT-SCHEDULE = S\_HRLY-RPT  
                                  REPORT-BLOCK = (AHU-BLK,BB-BASE-BK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..

INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E   P L A N T S   I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE    LINE-1 \*      EMC      ENGINEERS      INC.      \*  
          LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
          LINE-3 \*      DENVER,      CO      80227      \*

| EMC ENGINEERS INC. 80227 E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:34:56 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|---|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
| DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. #6 POST CHAPEL  |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR PACK-COOLU TOPEKA, KS                                   |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----   |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
| MONTH   | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -82.543                     | 28                      | -2. F                | -3. F                | -279.291                                | 4309.                     | 7.709                           |
| FEB   | 0.00000                     |                         |                      |                      | -62.178                     | 3                       | -1. F                | -2. F                | -263.889                                | 3941.                     | 7.709                           |
| MAR   | 0.00000                     |                         |                      |                      | -50.703                     | 3                       | 15. F                | 12. F                | -218.655                                | 4625.                     | 7.609                           |
| APR   | 0.00000                     |                         |                      |                      | -17.652                     | 5                       | 31. F                | 28. F                | -147.942                                | 4658.                     | 7.609                           |
| MAY   | 15.02411                    | 30                      | 11                   | 74. F                | -3.822                      | 5                       | 44. F                | 40. F                | -89.738                                 | 6285.                     | 29.324                          |
| JUN   | 41.79997                    | 26                      | 11                   | 82. F                | 0.000                       |                         |                      |                      | 0.000                                   | 8762.                     | 33.092                          |
| JUL   | 57.81033                    | 24                      | 11                   | 82. F                | 0.000                       |                         |                      |                      | 0.000                                   | 10448.                    | 33.070                          |
| AUG   | 55.58031                    | 21                      | 11                   | 88. F                | 0.000                       |                         |                      |                      | 0.000                                   | 10395.                    | 33.860                          |
| SEP   | 25.08428                    | 5                       | 11                   | 78. F                | 0.000                       |                         |                      |                      | 0.000                                   | 7144.                     | 31.813                          |
| OCT   | 0.06926                     | 1                       | 18                   | 83. F                | -15.445                     | 20                      | 24. F                | 23. F                | -154.202                                | 4831.                     | 10.438                          |
| NOV   | 0.00000                     |                         |                      |                      | -41.006                     | 3                       | 13. F                | 12. F                | -203.021                                | 4517.                     | 7.609                           |
| DEC   | 0.00000                     |                         |                      |                      | -74.744                     | 13                      | 2. F                 | 1. F                 | -262.964                                | 4385.                     | 7.709                           |
| TOTAL   | 195.368                     |                         |                      |                      | -348.092                    |                         |                      |                      | -279.291                                | 74299.                    |                                 |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                           | 33.860                          |

| EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:34:56 SDL RUN 1 |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
|---|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. #6 POST CHAPEL                                      |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR PACK-COOLU TOPEKA, KS                                |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----   |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| MONTH   | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN   | 0                        | 633                      | 0  | 111               | 744                        | 0                          | 633                          | 137                       | 0                                    | -8.440   | 4.720  |
| FEB   | 0                        | 583                      | 0  | 89                | 672                        | 0                          | 583                          | 135                       | 0                                    | -6.526   | 4.720  |
| MAR   | 0                        | 701                      | 0  | 43                | 744                        | 0                          | 701                          | 205                       | 0                                    | -6.900   | 4.720  |
| APR   | 0                        | 634                      | 0  | 86                | 720                        | 0                          | 717                          | 237                       | 83                                   | -4.271   | 4.720  |
| MAY   | 242                      | 265                      | 0  | 237               | 360                        | 245                        | 744                          | 248                       | 0                                    | 0.000  | 29.015   |
| JUN   | 467                      | 0                        | 0  | 253               | 0                          | 468                        | 720                          | 240                       | 0                                    | 0.000  | 32.956   |
| JUL   | 496                      | 0                        | 0  | 248               | 0                          | 498                        | 742                          | 246                       | 0                                    | 0.000  | 33.070   |
| AUG   | 496                      | 0                        | 0  | 248               | 0                          | 512                        | 728                          | 232                       | 0                                    | 0.000  | 33.860   |
| SEP   | 355                      | 0                        | 0  | 365               | 0                          | 355                        | 720                          | 240                       | 0                                    | 0.000  | 31.813   |
| OCT   | 4                        | 608                      | 0  | 132               | 720                        | 4                          | 743                          | 247                       | 0                                    | 0.000  | 10.438   |
| NOV   | 0                        | 681                      | 0  | 39                | 720                        | 0                          | 687                          | 207                       | 6                                    | -7.160   | 4.720  |
| DEC   | 0                        | 650                      | 0  | 94                | 744                        | 0                          | 650                          | 154                       | 0                                    | 0.000  | 0.000  |
| ANNUAL  | 2060                     | 4755                     | 0  | 1945              | 5424                       | 2082                       | 8368                         | 2528                      | 0                                    |  | 1553   |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:34:56 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. #6 POST CHAPEL  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR BB-RADIATN TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |  |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|--|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | MAXIMUM<br>ELEC<br>TRICAL<br>ENERGY<br>(KWH) |
| JAN   | 0.00000                     |                         |                      |                      | -10.996                     | 29                      | 6                    | 11.F 9.F             | -37.420                                 | 1316.  |
| FEB   | 0.00000                     |                         |                      |                      | -8.162                      | 3                       | 6                    | -1.F -2.F            | -37.420                                 | 1189.  |
| MAR   | 0.00000                     |                         |                      |                      | -5.954                      | 3                       | 6                    | 15.F 12.F            | -37.420                                 | 1316.  |
| APR   | 0.00000                     |                         |                      |                      | -1.253                      | 1                       | 6                    | 54.F 50.F            | -22.512                                 | 1274.  |
| MAY   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1316.  |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1274.  |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1316.  |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1274.  |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1316.  |
| OCT   | 0.00000                     |                         |                      |                      | -0.190                      | 31                      | 6                    | 44.F 39.F            | -16.793                                 | 1316.  |
| NOV   | 0.00000                     |                         |                      |                      | -3.499                      | 2                       | 6                    | 15.F 14.F            | -27.520                                 | 1274.  |
| DEC   | 0.00000                     |                         |                      |                      | -9.708                      | 30                      | 6                    | 21.F 18.F            | -37.420                                 | 1316.  |
| TOTAL | 0.000                       |                         |                      |                      | -39.761                     |                         |                      |                      | -37.420                                 | 15499.                                       |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   | 2.889  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:34:56 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. #6 POST CHAPEL  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR BB-RADIATN TOPEKA, KS

| MONTH | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  |  |  |
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EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:34:56 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. #6 POST CHAPEL  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>23.845<br>44.373<br>28/ 9 | NATURAL-GAS<br>130.799<br>398.527<br>28/ 6 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 21.585<br>44.373<br>3/ 8                 | 101.427<br>382.319<br>3/ 6                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 24.528<br>44.032<br>31/20                | 86.040<br>333.863<br>3/ 6                  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 22.544<br>44.032<br>17/ 8                | 31.846<br>237.581<br>5/ 6                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 26.648<br>109.987<br>22/11               | 7.150<br>144.731<br>5/ 6                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 34.268<br>122.855<br>19/11               | 0.000<br>0.000<br>30/ 1                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 40.170<br>122.778<br>24/11               | 0.000<br>0.000<br>31/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 39.987<br>125.477<br>21/11               | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 28.743<br>118.488<br>5/11                | 0.000<br>0.000<br>30/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 23.099<br>45.503<br>1/18                 | 27.165<br>220.072<br>20/ 6                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 23.466<br>44.032<br>30/20                | 69.073<br>299.928<br>2/ 6                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 24.067<br>44.373<br>13/ 8                | 120.223<br>381.340<br>13/ 6                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |  |  |
|     | ONE YEAR<br>USE/PEAK                             | 332.949<br>125.477                       | 573.724<br>398.527                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:34:56 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. #6 POST CHAPEL  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 20.75       | 573.72      |
| SPACE COOL      | 65.91       | 0.00        |
| HVAC AUX        | 140.45      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 105.85      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 0.00        | 0.00        |
| TOTAL           | 332.96      | 573.72      |

TOTAL SITE ENERGY 906.67 MBTU 156.9 KBTU/SQFT-YR GROSS-AREA 156.9 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1573.57 MBTU 272.2 KBTU/SQFT-YR GROSS-AREA 272.2 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTILING RANGE = 0.2  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #2 DDC CONTROL FOR BLDG. #6      *
        LINE-5 *POST CHAPEL      * ..

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
SD_WT_HT   =DAY-SCHEDULE (1,24) (70.) ..
SD_SM_CL   =DAY-SCHEDULE (1,24) (76.) ..
SD_WT_CL   =DAY-SCHEDULE (1,24) (72.) ..
SD_SM_HT   =DAY-SCHEDULE (1,24) (74.) ..
SD_OA%     =DAY-SCHEDULE (1,24) (0.16) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..

SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT   =WEEK-SCHEDULE (ALL) SD_WT_HT ..


SW_SM_CL   =WEEK-SCHEDULE (ALL) SD_SM_CL ..

SW_WT_CL   =WEEK-SCHEDULE (ALL) SD_WT_CL ..

SW_SM_HT   =WEEK-SCHEDULE (ALL) SD_SM_HT ..

SW_OA%     =WEEK-SCHEDULE (ALL) SD_OA% ..

```



## \$ FULL ON SYSTEM

```

S_ON      =SCHEDULE THRU DEC 31 SW_ON ..

```

## \$ FULL OFF SYSTEM

```

S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..

```

## \$ HEATING SEASON

```

S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
            THRU OCT 1 SW_OFF

```



THRU DEC 31 SW\_ON ..

\$ COOLING SEASON

S\_CL\_SCHD =SCHEDULE THRU MAY 15 SW\_OFF  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

\$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

\$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
THRU JAN 15 SW\_ON  
THRU AUG 20 SW\_OFF  
THRU AUG 21 SW\_ON  
THRU DEC 31 SW\_OFF ..

\$ ZONE DESCRIPTION

UP-STAIRS =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 8000.  
SIZING-OPTION = FROM-LOADS ..

BASEMENT =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
BASEBOARD-CTRL = THERMOSTATIC  
SIZING-OPTION = FROM-LOADS ..

\$ SYSTEM DESCRIPTION

PACK-COOLU =SYSTEM SYSTEM-TYPE = PSZ  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE-SCHED  
COOLING-SCHEDULE = S\_CL\_SCHD OA-CONTROL = FIXED  
SUPPLY-CFM = 8000. RATED-CFM = 8000.  
MIN-AIR-SCH = S\_OA% SUPPLY-DELTA-T = 1.8  
SUPPLY-KW = 0.00059 NIGHT-CYCLE-CTRL = STAY-OFF  
NIGHT-VENT-DT = 0.0 COOLING-CAPACITY = 240000.  
COOL-SH-CAP = 180000. COOL-FT-MIN = 0.  
HEATING-CAPACITY = -800000. CRANKCASE-MAX-T = 0.  
OUTSIDE-FAN-T = 45. HEAT-SOURCE = HOT-WATER

BASEBOARD-SOURCE = HOT-WATER  
 SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (UP-STAIRS) ..

BB-RADIATN =SYSTEM SYSTEM-TYPE = FPH  
 HEATING-SCHEDULE = S\_HE-SCHED  
 ZONE-NAMES = (BASEMENT) ..

## \$ HOURLY REPORT DESCRIPTION

ZONE-UP-BK =REPORT-BLOCK VARIABLE-TYPE = UP-STAIRS  
 VARIABLE-LIST = (17,18,7,6) ..  
 ZONE-BS-BK =REPORT-BLOCK VARIABLE-TYPE = BASEMENT  
 VARIABLE-LIST = (17,18,7,6) ..  
 AHU-BLK =REPORT-BLOCK VARIABLE-TYPE = PACK-COOLU  
 VARIABLE-LIST = (3,5,6,17) ..  
 BB-BASE-BK =REPORT-BLOCK VARIABLE-TYPE = BB-RADIATN  
 VARIABLE-LIST = (7) ..  
 ZONES-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONE-UP-BK,ZONE-BS-BK)  
 ..  
 SYS-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (AHU-BLK,BB-BASE-BK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..

INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #2 DDC CONTROL FOR BLDG. #6 \*  
 LINE-5 \*POST CHAPEL \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
 SUMMARY=(PS-B,BEPS)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 PD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:17:11 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #6 POST CHAPEL  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR PACK-COOLU TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -91.728                     | 15                      | -8.F                 | -9.F                 | -214.177                                | 4833.                              | 7.709                           |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -68.459                     | 3                       | -1.F                 | -2.F                 | -193.897                                | 4361.                              | 7.709                           |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -53.636                     | 3                       | 5                    | 13.F                 | -155.016                                | 4828.                              | 7.609                           |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -15.672                     | 1                       | 1                    | 32.F                 | -101.829                                | 4672.                              | 7.609                           |
| MAY   | 11.12077                    | 30                      | 11                   | 74.F                 | 213.123                                 | -2.816                      | 5                       | 6                    | 44.F                 | -53.946                                 | 5941.                              | 26.702                          |
| JUN   | 36.97848                    | 26                      | 11                   | 82.F                 | 264.296                                 | 0.000                       |                         |                      |                      | 0.000                                   | 8373.                              | 31.701                          |
| JUL   | 55.90189                    | 24                      | 11                   | 82.F                 | 280.096                                 | 0.000                       |                         |                      |                      | 0.000                                   | 10382.                             | 32.574                          |
| AUG   | 53.67009                    | 21                      | 11                   | 88.F                 | 288.588                                 | 0.000                       |                         |                      |                      | 0.000                                   | 10355.                             | 34.044                          |
| SEP   | 19.23550                    | 5                       | 11                   | 78.F                 | 242.670                                 | 0.000                       |                         |                      |                      | 0.000                                   | 6619.                              | 29.400                          |
| OCT   | 0.00000                     |                         |                      |                      | 0.000                                   | -13.213                     | 20                      | 8                    | 23.F                 | -103.539                                | 4828.                              | 7.609                           |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -42.501                     | 3                       | 5                    | 13.F                 | -140.504                                | 4672.                              | 7.609                           |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -82.140                     | 15                      | 2                    | 3.F                  | -197.033                                | 4828.                              | 7.709                           |
| TOTAL | 176.907                     |                         |                      |                      |   | -370.164                    |                         |                      |                      | -214.177                                | 74692.                             |                                 |
| MAX   |                             |                         |                      |                      | 288.588                                 |                             |                         |                      |                      |   |                                    | 34.044                          |

H9-30

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:17:11 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #6 POST CHAPEL  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR PACK-COOLU TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |  |                   |                            |                            |                  |                              |                           |                                      | C O I N C I D E N T L O A D S                      |  |
|--------|---------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------|------------------------------|---------------------------|--------------------------------------|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0                         | 744                      | 0  | 0                 | 744                        | 0                          | 744              | 0                            | 0                         | 0                                    | -110.061   | 4.720  |
| FEB    | 0                         | 671                      | 0  | 1                 | 672                        | 0                          | 672              | 0                            | 0                         | 1                                    | -100.305   | 4.720  |
| MAR    | 0                         | 739                      | 0  | 5                 | 744                        | 0                          | 744              | 0                            | 0                         | 5                                    | -100.927   | 4.720  |
| APR    | 0                         | 548                      | 0  | 172               | 720                        | 0                          | 720              | 0                            | 0                         | 172                                  | -14.313  | 4.720  |
| MAY    | 256                       | 223                      | 0  | 265               | 360                        | 257                        | 744              | 0                            | 0                         | 265                                  | 0.000  | 26.311   |
| JUN    | 629                       | 0                        | 0  | 91                | 0                          | 631                        | 720              | 0                            | 0                         | 91                                   | 0.000  | 31.701   |
| JUL    | 739                       | 0                        | 0  | 5                 | 0                          | 740                        | 744              | 0                            | 0                         | 5                                    | 0.000  | 32.574   |
| AUG    | 732                       | 0                        | 0  | 12                | 0                          | 732                        | 744              | 0                            | 0                         | 12                                   | 0.000  | 34.044   |
| SEP    | 392                       | 0                        | 0  | 328               | 0                          | 397                        | 720              | 0                            | 0                         | 328                                  | 0.000  | 29.400   |
| OCT    | 0                         | 547                      | 0  | 197               | 0                          | 0                          | 744              | 0                            | 0                         | 197                                  | -67.015  | 4.720  |
| NOV    | 0                         | 686                      | 0  | 34                | 720                        | 0                          | 720              | 0                            | 0                         | 34                                   | -115.155   | 4.720  |
| DEC    | 0                         | 744                      | 0  | 0                 | 744                        | 0                          | 744              | 0                            | 0                         | 0                                    | -122.576   | 4.720  |
| ANNUAL | 2748                      | 4902                     | 0  | 1110              | 5424                       | 2757                       | 8760             | 0                            | 0                         | 1110                                 |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:17:11 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #6 POST CHAPEL  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR BB-RADIATN TOPEKA, KS

| MONTH | COOLING                     |                         |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING              |                             |                         | TIME<br>OF MAX<br>DY HR | HEATING              |                      |                           | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELECTRIC                        |  |
|-------|-----------------------------|-------------------------|----------------------|---|----------------------|-----------------------------|-------------------------|-------------------------|----------------------|----------------------|---------------------------|---|---------------------------------|--|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP |   | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR |                         | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | TRICAL<br>ENERGY<br>(KWH) |   | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |  |
| JAN   | 0.00000                     |                         |                      | 0.000                                   | -10.284              | 4                           | 3                       | 8.F                     | 7.F                  | -31.708              | 1316.                     | 2.889                                   |                                 |  |
| FEB   | 0.00000                     |                         |                      | 0.000                                   | -7.348               | 2                           | 3                       | 13.F                    | 11.F                 | -26.082              | 1189.                     | 2.889                                   |                                 |  |
| MAR   | 0.00000                     |                         |                      | 0.000                                   | -4.953               | 3                           | 4                       | 16.F                    | 13.F                 | -25.214              | 1316.                     | 2.889                                   |                                 |  |
| APR   | 0.00000                     |                         |                      | 0.000                                   | -0.651               | 1                           | 3                       | 36.F                    | 32.F                 | -13.282              | 1274.                     | 2.889                                   |                                 |  |
| MAY   | 0.00000                     |                         |                      | 0.000                                   | 0.000                |                             |                         |                         |                      | 0.000                | 1316.                     | 2.889                                   |                                 |  |
| JUN   | 0.00000                     |                         |                      | 0.000                                   | 0.000                |                             |                         |                         |                      | 0.000                | 1274.                     | 2.889                                   |                                 |  |
| JUL   | 0.00000                     |                         |                      | 0.000                                   | 0.000                |                             |                         |                         |                      | 0.000                | 1316.                     | 2.889                                   |                                 |  |
| AUG   | 0.00000                     |                         |                      | 0.000                                   | 0.000                |                             |                         |                         |                      | 0.000                | 1316.                     | 2.889                                   |                                 |  |
| SEP   | 0.00000                     |                         |                      | 0.000                                   | 0.000                |                             |                         |                         |                      | 0.000                | 1274.                     | 2.889                                   |                                 |  |
| OCT   | 0.00000                     |                         |                      | 0.000                                   | -0.003               | 31                          | 5                       | 45.F                    | 40.F                 | -1.125               | 1316.                     | 2.889                                   |                                 |  |
| NOV   | 0.00000                     |                         |                      | 0.000                                   | -2.507               | 30                          | 5                       | 29.F                    | 26.F                 | -15.696              | 1274.                     | 2.889                                   |                                 |  |
| DEC   | 0.00000                     |                         |                      | 0.000                                   | -8.907               | 15                          | 5                       | 8.F                     | 7.F                  | -27.475              | 1316.                     | 2.889                                   |                                 |  |
| TOTAL | 0.000                       |                         |                      | 0.000                                   | -34.653              |                             |                         |                         |                      | -31.708              | 15499.                    | 2.889                                   |                                 |  |
| MAX   |                             |                         |                      |   |                      |                             |                         |                         |                      |                      |                           |   |                                 |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:17:11 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #6 POST CHAPEL  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR BB-RADIATN TOPEKA, KS

| MONTH  | HOURS           |                 |                   | HOURS    |                   |                   | HOURS      |                   |            | HOURS             |            |                   | COINCIDENT |                   |            | HEATING           |                 |                 | ELECTRIC        |                 |                 |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS<br>ON | COOLING<br>AVAIL. | FANS<br>ON | COOLING<br>AVAIL. | FANS<br>ON | COOLING<br>AVAIL. | FANS<br>ON | COOLING<br>AVAIL. | FANS<br>ON | COOLING<br>AVAIL. | LOAD AT<br>PEAK | LOAD AT<br>PEAK | LOAD AT<br>PEAK | LOAD AT<br>PEAK | LOAD AT<br>PEAK |
| JAN    | 0               | 744             | 0                 | 0        | 744               | 744               | 744        | 744               | 744        | 744               | 744        | 744               | 744        | 744               | 744        | 744               | -13.558         | 0.000           | 0.000           | 0.000           | 0.000           |
| FEB    | 0               | 661             | 0                 | 11       | 672               | 672               | 672        | 672               | 672        | 672               | 672        | 672               | 672        | 672               | 672        | 672               | -11.869         | 0.000           | 0.000           | 0.000           | 0.000           |
| MAR    | 0               | 601             | 0                 | 143      | 744               | 744               | 744        | 744               | 744        | 744               | 744        | 744               | 744        | 744               | 744        | 744               | -12.469         | 0.000           | 0.000           | 0.000           | 0.000           |
| APR    | 0               | 149             | 0                 | 571      | 720               | 720               | 720        | 720               | 720        | 720               | 720        | 720               | 720        | 720               | 720        | 720               | 0.000           | 0.000           | 0.000           | 0.000           | 0.000           |
| MAY    | 0               | 0               | 0                 | 744      | 360               | 744               | 360        | 744               | 360        | 744               | 360        | 744               | 360        | 744               | 360        | 744               | 0.000           | 0.000           | 0.000           | 0.000           | 0.000           |
| JUN    | 0               | 0               | 0                 | 720      | 0                 | 720               | 0          | 720               | 0          | 720               | 0          | 720               | 0          | 720               | 0          | 720               | 0.000           | 0.000           | 0.000           | 0.000           | 0.000           |
| JUL    | 0               | 0               | 0                 | 744      | 0                 | 744               | 0          | 744               | 0          | 744               | 0          | 744               | 0          | 744               | 0          | 744               | 0.000           | 0.000           | 0.000           | 0.000           | 0.000           |
| AUG    | 0               | 0               | 0                 | 744      | 0                 | 744               | 0          | 744               | 0          | 744               | 0          | 744               | 0          | 744               | 0          | 744               | 0.000           | 0.000           | 0.000           | 0.000           | 0.000           |
| SEP    | 0               | 0               | 0                 | 720      | 0                 | 720               | 0          | 720               | 0          | 720               | 0          | 720               | 0          | 720               | 0          | 720               | 0.000           | 0.000           | 0.000           | 0.000           | 0.000           |
| OCT    | 0               | 4               | 0                 | 740      | 720               | 740               | 720        | 740               | 720        | 740               | 720        | 740               | 720        | 740               | 720        | 740               | -0.881          | 0.000           | 0.000           | 0.000           | 0.000           |
| NOV    | 0               | 416             | 0                 | 304      | 720               | 720               | 720        | 720               | 720        | 720               | 720        | 720               | 720        | 720               | 720        | 720               | -12.379         | 0.000           | 0.000           | 0.000           | 0.000           |
| DEC    | 0               | 741             | 0                 | 3        | 744               | 744               | 744        | 744               | 744        | 744               | 744        | 744               | 744        | 744               | 744        | 744               | -14.920         | 0.000           | 0.000           | 0.000           | 0.000           |
| ANNUAL | 0               | 3316            | 0                 | 5444     | 5424              | 8760              | 5424       | 8760              | 5424       | 8760              | 5424       | 8760              | 5424       | 8760              | 5424       | 8760              |                 |                 |                 |                 |                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:17:11 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #6 POST CHAPEL  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR |
|-----|--|---|---|
| JAN | 25.578<br>42.364<br>28/ 9                      | 140.406<br>300.728<br>15/ 3                       |   |
| FEB | 23.046<br>42.364<br>3/ 8                       | 108.252<br>277.847<br>3/ 6                        |   |
| MAR | 25.069<br>42.022<br>31/20                      | 88.053<br>237.353<br>3/ 5                         |   |
| APR | 22.117<br>42.022<br>17/ 7                      | 27.155<br>164.139<br>1/ 1                         |   |
| MAY | 25.256<br>101.035<br>22/11                     | 5.183<br>90.757<br>5/ 6                           |   |
| JUN | 32.938<br>118.105<br>26/11                     | 0.000<br>0.000<br>30/ 1                           |   |
| JUL | 39.942<br>121.087<br>24/11                     | 0.000<br>0.000<br>31/ 1                           |   |
| AUG | 39.851<br>126.106<br>21/11                     | 0.000<br>0.000<br>31/ 1                           |   |
| SEP | 26.950<br>110.248<br>5/11                      | 0.000<br>0.000<br>30/ 1                           |   |
| OCT | 22.650<br>42.022<br>31/ 9                      | 22.744<br>151.271<br>20/ 8                        |   |
| NOV | 23.760<br>42.022<br>30/20                      | 69.024<br>207.461<br>3/ 3                         |   |
| DEC | 25.532<br>42.364<br>13/ 8                      | 127.892<br>284.665<br>15/ 5                       |   |
|     | ONE YEAR<br>USE/PEAK                           | 332.690<br>126.106                                | 588.708<br>300.728                                |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:17:11 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #6 POST CHAPEL  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 20.39       | 588.71      |
| SPACE COOL      | 60.93       | 0.00        |
| HVAC AUX        | 145.53      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 105.85      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 0.00        | 0.00        |
| TOTAL           | 332.69      | 588.71      |

TOTAL SITE ENERGY 921.40 MBTU 159.4 KBTU/SQFT-YR GROSS-AREA 159.4 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1587.78 MBTU 274.7 KBTU/SQFT-YR GROSS-AREA 274.7 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #3 ECONOMIZER BLDG. #6      *
        LINE-5 *POST CHAPEL      * ..

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE  (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..
SD_WT_HT   =DAY-SCHEDULE  (1,5) (55.)
                (6,21) (74.)
                (22,24) (55.) ..
SD_SM_CL   =DAY-SCHEDULE  (1,5) (85.)
                (6,21) (72.)
                (22,24) (85.) ..
SD_WT_CL   =DAY-SCHEDULE  (1,5) (57.)
                (6,21) (76.)
                (22,24) (57.) ..
SD_SM_HT   =DAY-SCHEDULE  (1,5) (83.)
                (6,21) (70.)
                (22,24) (83.) ..
SD_OA%     =DAY-SCHEDULE  (1,24) (0.16) ..
SD_FAN_CYC =DAY-SCHEDULE  (1,5) (0.)
                (6,21) (1.)
                (22,24) (0.) ..

SW_ON      =WEEK-SCHEDULE  (ALL) SD_ON ..
SW_OFF     =WEEK-SCHEDULE  (ALL) SD_OFF ..
SW_WT_HT   =WEEK-SCHEDULE  (ALL) SD_WT_HT ..
SW_SM_CL   =WEEK-SCHEDULE  (ALL) SD_SM_CL ..
SW_WT_CL   =WEEK-SCHEDULE  (ALL) SD_WT_CL ..
SW_SM_HT   =WEEK-SCHEDULE  (ALL) SD_SM_HT ..
SW_OA%     =WEEK-SCHEDULE  (ALL) SD_OA% ..

```



SW\_FAN\_CYC =WEEK-SCHEDULE (ALL) SD\_FAN\_CYC ..

\$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

\$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

\$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
THRU OCT 1 SW\_OFF  
THRU DEC 31 SW\_ON ..

\$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

\$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

\$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
THRU JAN 15 SW\_ON  
THRU AUG 20 SW\_OFF  
THRU AUG 21 SW\_ON  
THRU DEC 31 SW\_OFF ..

S\_FAN\_CYCL =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

\$ ZONE DESCRIPTION

UP-STAIRS =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 8000.  
SIZING-OPTION = FROM-LOADS ..

BASEMENT =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
BASEBOARD-CTRL = THERMOSTATIC  
SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

```

PACK-COOLU =SYSTEM    SYSTEM-TYPE = PSZ
                      MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
                      HEATING-SCHEDULE = S_HE-SCHED
                      COOLING-SCHEDULE = S_CL_SCHED  ECONO-LIMIT-T = 69.0
                      SUPPLY-CFM = 8000.  RATED-CFM = 8000.
                      MIN-OUTSIDE-AIR = 0.16  FAN-SCHEDULE = S_FAN_CYCL
                      SUPPLY-DELTA-T = 1.8  SUPPLY-KW = 0.00059
                      NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  NIGHT-VENT-DT = 0.0
                      COOLING-CAPACITY = 240000.  COOL-SH-CAP = 180000.
                      COOL-FT-MIN = 0.  HEATING-CAPACITY = -800000.
                      CRANKCASE-MAX-T = 0.  OUTSIDE-FAN-T = 45.
                      HEAT-SOURCE = HOT-WATER
                      BASEBOARD-SOURCE = HOT-WATER
                      SIZING-OPTION = COINCIDENT
                      ZONE-NAMES = (UP-STAIRS) ..

```

```

BB-RADIATN =SYSTEM    SYSTEM-TYPE = FPH
                      HEATING-SCHEDULE = S_HE-SCHED
                      ZONE-NAMES = (BASEMENT) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

ZONE-UP-BK =REPORT-BLOCK VARIABLE-TYPE = UP-STAIRS
                      VARIABLE-LIST = (17,18,7,6) ..
ZONE-BS-BK =REPORT-BLOCK VARIABLE-TYPE = BASEMENT
                      VARIABLE-LIST = (17,18,7,6) ..
AHU-BLK    =REPORT-BLOCK VARIABLE-TYPE = PACK-COOLU
                      VARIABLE-LIST = (3,5,6,17) ..
BB-BASE-BK =REPORT-BLOCK VARIABLE-TYPE = BB-RADIATN
                      VARIABLE-LIST = (7) ..
ZONES-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
                      REPORT-BLOCK = (ZONE-UP-BK,ZONE-BS-BK)
..
SYS-HRLY   = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
                      REPORT-BLOCK = (AHU-BLK,BB-BASE-BK)
..
END ..
COMPUTE SYSTEMS ..

```

INPUT PLANT ..

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

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## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *    EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *   DENVER,      CO      80227      *

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| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:43:43 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 RUN #3 ECONOMIZER BLDG. #6 POST CHAPEL  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR PACK-COOLU TOPEKA, KS                            |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----                                    |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN  | 0.00000                     |                         |                      |                      | -81.556                     | 28                      | -2. F                | -3. F                | -279.321                                | 4125.                              | 7.709                           |
| FEB  | 0.00000                     |                         |                      |                      | -61.129                     | 3                       | -1. F                | -2. F                | -263.886                                | 3724.                              | 7.709                           |
| MAR  | 0.00000                     |                         |                      |                      | -50.344                     | 3                       | 15. F                | 12. F                | -220.044                                | 4205.                              | 7.609                           |
| APR  | 0.00000                     |                         |                      |                      | -19.991                     | 5                       | 31. F                | 28. F                | -152.387                                | 4441.                              | 7.609                           |
| MAY  | 12.75226                    | 30                      | 11                   | 74. F                | -5.326                      | 5                       | 44. F                | 40. F                | -105.476                                | 6050.                              | 29.323                          |
| JUN  | 38.66085                    | 26                      | 11                   | 82. F                | 0.000                       |                         |                      |                      | 0.000                                   | 8481.                              | 33.092                          |
| JUL  | 56.66064                    | 24                      | 11                   | 82. F                | 0.000                       |                         |                      |                      | 0.000                                   | 10349.                             | 33.070                          |
| AUG  | 53.86172                    | 21                      | 11                   | 88. F                | 0.000                       |                         |                      |                      | 0.000                                   | 10243.                             | 33.860                          |
| SEP  | 22.85937                    | 5                       | 11                   | 78. F                | 0.000                       |                         |                      |                      | 0.000                                   | 6945.                              | 31.813                          |
| OCT  | 0.09829                     | 1                       | 18                   | 83. F                | -18.325                     | 20                      | 24. F                | 23. F                | -158.405                                | 4612.                              | 10.843                          |
| NOV  | 0.00000                     |                         |                      |                      | -41.293                     | 3                       | 13. F                | 12. F                | -203.622                                | 4186.                              | 7.609                           |
| DEC  | 0.00000                     |                         |                      |                      | -73.809                     | 13                      | 2. F                 | 1. F                 | -262.159                                | 4158.                              | 7.709                           |
| TOTAL  | 184.893                     |                         |                      |                      | -351.773                    |                         |                      |                      | -279.321                                | 71520.                             |                                 |
| MAX  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    | 33.860                          |

H9-38

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:43:43 SDL RUN 1 |         |            |          |         |         |          |         |           |          |            |          |
|--|---------|------------|----------|---------|---------|----------|---------|-----------|----------|------------|----------|
| DENVER, CO 80227 RUN #3 ECONOMIZER BLDG. #6 POST CHAPEL  |         |            |          |         |         |          |         |           |          |            |          |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR PACK-COOLU TOPEKA, KS                               |         |            |          |         |         |          |         |           |          |            |          |
| ----- N U M B E R O F H O U R S -----  |         |            |          |         |         |          |         |           |          |            |          |
| HOURS  |         |            | HOURS    |         |         | HOURS    |         |           | HOURS    |            |          |
| COOLING  | HEATING | COINCIDENT | FLOATING | HEATING | COOLING | FANS ON  | FANS ON | HEATING   | FLOATING | COINCIDENT | ELECTRIC |
| LOAD   | LOAD    | LOAD       | LOAD     | AVAIL.  | AVAIL.  | CYCLE ON | VENTING | LOAD AT   | WHEN     | LOAD AT    | LOAD AT  |
| MONTH  | LOAD    | LOAD       | LOAD     | LOAD    | LOAD    | LOAD     | LOAD    | COOLING   | FANS ON  | COOLING    | COOLING  |
|  |         |            |          |         |         |          |         | PEAK      | FANS ON  | PEAK       | PEAK     |
|  |         |            |          |         |         |          |         | (KBTU/HR) |          | (KW)       |          |
| JAN  | 0       | 563        | 0        | 181     | 744     | 0        | 594     | 98        | 0        | -2.118     | 4.720    |
| FEB  | 0       | 495        | 0        | 177     | 672     | 0        | 537     | 89        | 0        | 0.000      | 4.720    |
| MAR  | 0       | 525        | 0        | 219     | 744     | 0        | 612     | 116       | 0        | 0.000      | 4.720    |
| APR  | 0       | 413        | 0        | 307     | 720     | 0        | 671     | 191       | 0        | 0.000      | 4.720    |
| MAY  | 175     | 160        | 0        | 409     | 360     | 245      | 736     | 240       | 0        | 0.000      | 29.014   |
| JUN  | 394     | 0          | 0        | 326     | 0       | 468      | 720     | 240       | 0        | 0.000      | 32.956   |
| JUL  | 479     | 0          | 0        | 265     | 0       | 498      | 742     | 246       | 0        | 0.000      | 33.070   |
| AUG  | 469     | 0          | 0        | 275     | 0       | 512      | 728     | 232       | 0        | 0.000      | 33.860   |
| SEP  | 294     | 0          | 0        | 426     | 0       | 355      | 720     | 240       | 0        | 0.000      | 31.813   |
| OCT  | 5       | 383        | 0        | 356     | 720     | 5        | 696     | 200       | 0        | 0.000      | 10.843   |
| NOV  | 0       | 500        | 0        | 220     | 720     | 0        | 617     | 137       | 0        | -6.959     | 4.720    |
| DEC  | 0       | 559        | 0        | 185     | 744     | 0        | 602     | 106       | 0        | -11.314    | 4.720    |
| ANNUAL   | 1816    | 3598       | 0        | 3346    | 5424    | 2083     | 7975    | 2135      | 0        |            |          |

| EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:43:43 SDL RUN 1 |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
|---|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 RUN #3 ECONOMIZER BLDG. #6 POST CHAPEL   |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR BB-RADIATN TOPEKA, KS                             |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----                                     |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
| MONTH   | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -10.996                     | 29                      | 6                    | 11.F                 | 9.F                                     | 1316.                              | 2.889                           |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -8.162                      | 3                       | 6                    | -1.F                 | -2.F                                    | 1189.                              | 2.889                           |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -5.954                      | 3                       | 6                    | 15.F                 | 12.F                                    | 1316.                              | 2.889                           |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -1.253                      | 1                       | 6                    | 54.F                 | 50.F                                    | 1274.                              | 2.889                           |
| MAY   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1316.                              | 2.889                           |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1274.                              | 2.889                           |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1316.                              | 2.889                           |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1274.                              | 2.889                           |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1316.                              | 2.889                           |
| OCT   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.190                      | 31                      | 6                    | 44.F                 | 39.F                                    | 1316.                              | 2.889                           |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -3.499                      | 2                       | 6                    | 15.F                 | 14.F                                    | 1274.                              | 2.889                           |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -9.708                      | 30                      | 6                    | 21.F                 | 18.F                                    | 1316.                              | 2.889                           |
| TOTAL   | 0.000                       |                         |                      |                      |   | -39.761                     |                         |                      |                      |   | 15499.                             |                                 |
| MAX   |                             |                         |                      |                      | 0.000                                   |                             |                         |                      |                      | -37.420                                 |                                    | 2.889                           |

| EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:43:43 SDL RUN 1 |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
|---|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #3 ECONOMIZER BLDG. #6 POST CHAPEL   |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR BB-RADIATN TOPEKA, KS                                |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----   |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| MONTH   | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | --COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN   | 0                        | 496                      | 0  | 248               | 744                        | 744                        | 744                          | 0                         | 248                                  | 0.000  | 0.000  |
| FEB   | 0                        | 448                      | 0  | 224               | 672                        | 672                        | 672                          | 0                         | 224                                  | 0.000  | 0.000  |
| MAR   | 0                        | 484                      | 0  | 260               | 744                        | 744                        | 744                          | 0                         | 260                                  | 0.000  | 0.000  |
| APR   | 0                        | 182                      | 0  | 538               | 720                        | 720                        | 720                          | 0                         | 538                                  | 0.000  | 0.000  |
| MAY   | 0                        | 0                        | 0  | 744               | 360                        | 744                        | 360                          | 0                         | 360                                  | 0.000  | 0.000  |
| JUN   | 0                        | 0                        | 0  | 720               | 0                          | 720                        | 0                            | 0                         | 0                                    | 0.000  | 0.000  |
| JUL   | 0                        | 0                        | 0  | 744               | 0                          | 744                        | 0                            | 0                         | 0                                    | 0.000  | 0.000  |
| AUG   | 0                        | 0                        | 0  | 744               | 0                          | 744                        | 0                            | 0                         | 0                                    | 0.000  | 0.000  |
| SEP   | 0                        | 0                        | 0  | 720               | 0                          | 720                        | 0                            | 0                         | 0                                    | 0.000  | 0.000  |
| OCT   | 0                        | 43                       | 0  | 701               | 720                        | 744                        | 720                          | 0                         | 677                                  | 0.000  | 0.000  |
| NOV   | 0                        | 379                      | 0  | 341               | 720                        | 720                        | 720                          | 0                         | 341                                  | 0.000  | 0.000  |
| DEC   | 0                        | 496                      | 0  | 248               | 744                        | 744                        | 744                          | 0                         | 248                                  | 0.000  | 0.000  |
| ANNUAL  | 0                        | 2528                     | 0  | 6232              | 5424                       | 8760                       | 5424                         | 0                         | 2896                                 |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:43:43 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER BLDG. #6 POST CHAPEL  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>23.001<br>44.374<br>28/ 9 | NATURAL-GAS<br>128.765<br>398.565<br>28/ 6 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 20.591<br>44.374<br>3/ 8                 | 99.180<br>382.322<br>3/ 6                  |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 22.735<br>44.033<br>31/20                | 84.382<br>335.375<br>3/ 6                  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 21.643<br>44.033<br>25/ 7                | 34.568<br>242.642<br>5/ 6                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 25.817<br>109.986<br>22/11               | 9.148<br>163.367<br>5/ 6                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.308<br>122.855<br>19/11               | 0.000<br>0.000<br>30/ 1                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 39.830<br>122.778<br>24/11               | 0.000<br>0.000<br>31/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 39.470<br>125.477<br>21/11               | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 28.063<br>118.488<br>5/11                | 0.000<br>0.000<br>30/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 22.228<br>46.887<br>1/18                 | 30.728<br>224.899<br>20/ 6                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 22.045<br>44.033<br>30/20                | 68.539<br>302.110<br>2/ 6                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 23.042<br>44.374<br>13/ 8                | 118.134<br>380.494<br>13/ 6                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |  |  |
|     | ONE YEAR<br>USE/PEAK                             | 321.773<br>125.477                       | 573.444<br>398.565                         |

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 20.42       | 573.44      |
| SPACE COOL      | 62.75       | 0.00        |
| HVAC AUX        | 132.76      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 105.85      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 0.00        | 0.00        |
| TOTAL           | 321.78      | 573.44      |

TOTAL SITE ENERGY 895.22 MBTU 154.9 KBTU/SQFT-YR GROSS-AREA 154.9 KBTU/SQFT-YR NET-AREA  
TOTAL SOURCE ENERGY 1539.73 MBTU 266.4 KBTU/SQFT-YR GROSS-AREA 266.4 KBTU/SQFT-YR NET-AREA  
PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 4.7  
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #4 NIGHT INFILTRATION FOR BLDG. #6 *
        LINE-5 *POST CHAPEL      * ..

ABORT      ERRORS ..
DIAGNOSTIC      WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                  SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                  HOURLY-DATA-SAVE = YES ..


```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
SD_WT_HT   =DAY-SCHEDULE (1,24) (74.) ..
SD_SM_CL   =DAY-SCHEDULE (1,24) (72.) ..
SD_WT_CL   =DAY-SCHEDULE (1,24) (76.) ..
SD_SM_HT   =DAY-SCHEDULE (1,24) (70.) ..
SD_OA%     =DAY-SCHEDULE (1,5) (0.)
                  (6,21) (0.16)
                  (22,24) (0.) ..

```



```

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..
SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..
SW_WT_HT   =WEEK-SCHEDULE (ALL) SD_WT_HT ..
SW_SM_CL   =WEEK-SCHEDULE (ALL) SD_SM_CL ..
SW_WT_CL   =WEEK-SCHEDULE (ALL) SD_WT_CL ..
SW_SM_HT   =WEEK-SCHEDULE (ALL) SD_SM_HT ..
SW_OA%     =WEEK-SCHEDULE (ALL) SD_OA% ..

```

## \$ FULL ON SYSTEM

```

S_ON      =SCHEDULE THRU DEC 31 SW_ON ..

```

## \$ FULL OFF SYSTEM

```

S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..

```

## \$ HEATING SEASON



S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU AUG 20 SW\_OFF  
 THRU AUG 21 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ ZONE DESCRIPTION

UP-STAIRS =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 8000.  
 SIZING-OPTION = FROM-LOADS ..

BASEMENT =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 BASEBOARD-CTRL = THERMOSTATIC  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

PACK-COOLU =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED OA-CONTROL = FIXED  
 SUPPLY-CFM = 8000. RATED-CFM = 8000.  
 MIN-AIR-SCH = S\_OA% SUPPLY-DELTA-T = 1.8  
 SUPPLY-KW = 0.00059 NIGHT-CYCLE-CTRL = STAY-OFF  
 NIGHT-VENT-DT = 0.0 COOLING-CAPACITY = 240000.  
 COOL-SH-CAP = 180000. COOL-FT-MIN = 0.

HEATING-CAPACITY = -800000. CRANKCASE-MAX-T = 0.  
 OUTSIDE-FAN-T = 45. HEAT-SOURCE = HOT-WATER  
 BASEBOARD-SOURCE = HOT-WATER  
 SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (UP-STAIRS) ..

BB-RADIATN =SYSTEM SYSTEM-TYPE = FPH  
 HEATING-SCHEDULE = S\_HE-SCHED  
 ZONE-NAMES = (BASEMENT) ..

## \$ HOURLY REPORT DESCRIPTION

ZONE-UP-BK =REPORT-BLOCK VARIABLE-TYPE = UP-STAIRS  
 VARIABLE-LIST = (17,18,7,6) ..  
 ZONE-BS-BK =REPORT-BLOCK VARIABLE-TYPE = BASEMENT  
 VARIABLE-LIST = (17,18,7,6) ..  
 AHU-BLK =REPORT-BLOCK VARIABLE-TYPE = PACK-COOLU  
 VARIABLE-LIST = (3,5,6,17) ..  
 BB-BASE-BK =REPORT-BLOCK VARIABLE-TYPE = BB-RADIATN  
 VARIABLE-LIST = (7) ..  
 ZONES-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONE-UP-BK,ZONE-BS-BK)

..  
 SYS-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (AHU-BLK,BB-BASE-BK)

..  
 END ..  
 COMPUTE SYSTEMS ..

INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #4 NIGHT INFILTRATION FOR BLDG. #6 \*  
 LINE-5 \*POST CHAPEL \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
 SUMMARY=(PS-B,BEPS)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..

EMC ENGINEERS INC. EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:54: 3 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. #6 POST CHAPEL  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR PACK-COOLU TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                           |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -83.140                     | 15                      | 6                    | -9.F                 | -219.394                                | 4833.                     | 7.709                           |
| FEB   | 0.00000                     |                         |                      |                      | -62.451                     | 3                       | 6                    | -2.F                 | -207.651                                | 4361.                     | 7.709                           |
| MAR   | 0.00000                     |                         |                      |                      | -49.599                     | 3                       | 8                    | 12.F                 | -167.240                                | 4828.                     | 7.609                           |
| APR   | 0.00000                     |                         |                      |                      | -15.466                     | 5                       | 6                    | 28.F                 | -108.532                                | 4672.                     | 7.609                           |
| MAY   | 17.91902                    | 30                      | 11                   | 69.F                 | -2.839                      | 5                       | 6                    | 40.F                 | -67.263                                 | 6549.                     | 28.625                          |
| JUN   | 46.83541                    | 26                      | 11                   | 82.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 9278.                     | 32.859                          |
| JUL   | 63.72333                    | 24                      | 11                   | 82.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 11117.                    | 33.055                          |
| AUG   | 61.64609                    | 21                      | 11                   | 88.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 11140.                    | 34.031                          |
| SEP   | 29.05516                    | 5                       | 11                   | 78.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 7534.                     | 31.257                          |
| OCT   | 0.15188                     | 1                       | 18                   | 83.F                 | -13.291                     | 20                      | 8                    | 22.F                 | -115.476                                | 4845.                     | 11.486                          |
| NOV   | 0.00000                     |                         |                      |                      | -39.470                     | 3                       | 6                    | 12.F                 | -151.289                                | 4672.                     | 7.609                           |
| DEC   | 0.00000                     |                         |                      |                      | -75.114                     | 13                      | 6                    | 1.F                  | -204.382                                | 4828.                     | 7.709                           |
| TOTAL | 219.331                     |                         |                      |                      | -341.370                    |                         |                      |                      | -219.394                                | 78657.                    | 34.031                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |

H9-46

EMC ENGINEERS INC. EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:54: 3 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. #6 POST CHAPEL  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR PACK-COOLU TOPEKA, KS

| MONTH  | HOURS           |                 |                   |          | HOURS             |                   |         |                   | HOURS   |                   |         |                   | COINCIDENT LOADS--                                 |  |                         |                                 |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|---------|-------------------|---------|-------------------|---------|-------------------|--|--|-------------------------|---------------------------------|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | HEATING<br>AVAIL. | FANS ON | COOLING<br>AVAIL. | FANS ON | HEATING<br>AVAIL. | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | COOLING<br>PEAK<br>(KW) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN    | 0               | 744             | 0                 | 0        | 744               | 0                 | 744     | 0                 | 0       | 0                 | 0       | 0                 | -63.749  | 4.720  | 4.720                   | 4.720                           |
| FEB    | 0               | 672             | 0                 | 0        | 672               | 0                 | 672     | 0                 | 0       | 0                 | 0       | 0                 | -52.652  | 4.720  | 4.720                   | 4.720                           |
| MAR    | 0               | 743             | 0                 | 1        | 744               | 0                 | 744     | 0                 | 0       | 0                 | 1       | 0                 | -54.935  | 4.720  | 4.720                   | 4.720                           |
| APR    | 0               | 592             | 0                 | 128      | 720               | 0                 | 720     | 0                 | 0       | 0                 | 128     | 0                 | -1.655   | 4.720  | 4.720                   | 4.720                           |
| MAY    | 362             | 231             | 0                 | 151      | 360               | 365               | 744     | 0                 | 0       | 0                 | 151     | 0                 | 0.000  | 28.527   | 28.527                  | 28.527                          |
| JUN    | 704             | 0               | 0                 | 16       | 0                 | 705               | 720     | 0                 | 0       | 0                 | 16      | 0                 | 0.000  | 32.755   | 32.755                  | 32.755                          |
| JUL    | 744             | 0               | 0                 | 0        | 0                 | 744               | 744     | 0                 | 0       | 0                 | 0       | 0                 | 0.000  | 33.055   | 33.055                  | 33.055                          |
| AUG    | 744             | 0               | 0                 | 0        | 0                 | 744               | 744     | 0                 | 0       | 0                 | 0       | 0                 | 0.000  | 34.031   | 34.031                  | 34.031                          |
| SEP    | 576             | 0               | 0                 | 144      | 0                 | 577               | 720     | 0                 | 0       | 0                 | 144     | 0                 | 0.000  | 31.257   | 31.257                  | 31.257                          |
| OCT    | 9               | 563             | 0                 | 172      | 0                 | 10                | 744     | 0                 | 0       | 0                 | 172     | 0                 | 0.000  | 11.486   | 11.486                  | 11.486                          |
| NOV    | 0               | 709             | 0                 | 11       | 720               | 0                 | 720     | 0                 | 0       | 0                 | 11      | 0                 | -59.754  | 4.720  | 4.720                   | 4.720                           |
| DEC    | 0               | 744             | 0                 | 0        | 744               | 0                 | 744     | 0                 | 0       | 0                 | 0       | 0                 | -70.455  | 4.720  | 4.720                   | 4.720                           |
| ANNUAL | 3139            | 4998            | 0                 | 623      | 5424              | 3145              | 8760    | 0                 | 0       | 0                 | 623     | 0                 |  |  |                         |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:54: 3 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. #6 POST CHAPEL  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR BB-RADIATN TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                           |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -11.865                     | 4                       | 3                    | 8.F                  | 7.F                                     | 1316.                     | 2.889                           |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -8.782                      | 2                       | 3                    | 13.F                 | 11.F                                    | 1189.                     | 2.889                           |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -6.536                      | 3                       | 4                    | 16.F                 | 13.F                                    | 1316.                     | 2.889                           |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -1.436                      | 1                       | 3                    | 36.F                 | 32.F                                    | 1274.                     | 2.889                           |
| MAY   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1316.                     | 2.889                           |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1274.                     | 2.889                           |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1316.                     | 2.889                           |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1316.                     | 2.889                           |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1274.                     | 2.889                           |
| OCT   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.269                      | 31                      | 5                    | 45.F                 | 40.F                                    | 1316.                     | 2.889                           |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -3.923                      | 30                      | 5                    | 29.F                 | 26.F                                    | 1274.                     | 2.889                           |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -10.505                     | 15                      | 5                    | 8.F                  | 7.F                                     | 1316.                     | 2.889                           |
| TOTAL | 0.000                       |                         |                      |                      |   | -43.315                     |                         |                      |                      |   | 15499.                    |                                 |
| MAX   |                             |                         |                      |                      | 0.000                                   |                             |                         |                      |                      | -34.457                                 |                           | 2.889                           |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:54: 3 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. #6 POST CHAPEL  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR BB-RADIATN TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |                            |                   |                            |                            |                     |                     |                      |                           | C O I N C I D E N T   |                             | H E A T I N G                                      |   | E L E C                            |                                 |
|--------|---------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|---------------------|---------------------|----------------------|---------------------------|-----------------------|-----------------------------|--|---|------------------------------------|---------------------------------|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>ON | HOURS<br>CYCLE<br>ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOA<br>TING | HOURS<br>WHEN<br>FANS<br>ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | COOLING<br>LOAD AT<br>PEAK<br>(KW) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN    | 0                         | 744                      | 0                          | 0                 | 744                        | 744                        | 744                 | 744                 | 0                    | 0                         | 0                     | 0                           | -15.660  | 0.000   | 0.000                              | 0.000                           |
| FEB    | 0                         | 670                      | 0                          | 2                 | 672                        | 672                        | 672                 | 672                 | 0                    | 0                         | 2                     | 2                           | -13.959  | 0.000   | 0.000                              | 0.000                           |
| MAR    | 0                         | 680                      | 0                          | 64                | 744                        | 744                        | 744                 | 744                 | 0                    | 0                         | 64                    | 64                          | -14.686  | 0.000   | 0.000                              | 0.000                           |
| APR    | 0                         | 250                      | 0                          | 470               | 720                        | 720                        | 720                 | 720                 | 0                    | 0                         | 470                   | 470                         | 0.000  | 0.000   | 0.000                              | 0.000                           |
| MAY    | 0                         | 0                        | 0                          | 744               | 360                        | 744                        | 360                 | 360                 | 0                    | 0                         | 360                   | 360                         | 0.000  | 0.000   | 0.000                              | 0.000                           |
| JUN    | 0                         | 0                        | 0                          | 720               | 0                          | 720                        | 0                   | 0                   | 0                    | 0                         | 0                     | 0                           | 0.000  | 0.000   | 0.000                              | 0.000                           |
| JUL    | 0                         | 0                        | 0                          | 744               | 0                          | 744                        | 0                   | 0                   | 0                    | 0                         | 0                     | 0                           | 0.000  | 0.000   | 0.000                              | 0.000                           |
| AUG    | 0                         | 0                        | 0                          | 744               | 0                          | 744                        | 0                   | 0                   | 0                    | 0                         | 0                     | 0                           | 0.000  | 0.000   | 0.000                              | 0.000                           |
| SEP    | 0                         | 0                        | 0                          | 720               | 0                          | 720                        | 0                   | 0                   | 0                    | 0                         | 0                     | 0                           | 0.000  | 0.000   | 0.000                              | 0.000                           |
| OCT    | 0                         | 70                       | 0                          | 674               | 744                        | 744                        | 720                 | 720                 | 0                    | 0                         | 650                   | 650                         | -8.919   | 0.000   | 0.000                              | 0.000                           |
| NOV    | 0                         | 536                      | 0                          | 184               | 720                        | 720                        | 720                 | 720                 | 0                    | 0                         | 184                   | 184                         | -14.610  | 0.000   | 0.000                              | 0.000                           |
| DEC    | 0                         | 744                      | 0                          | 0                 | 744                        | 744                        | 744                 | 744                 | 0                    | 0                         | 0                     | 0                           | -16.786  | 0.000   | 0.000                              | 0.000                           |
| ANNUAL | 0                         | 3694                     | 0                          | 5066              | 5424                       | 8760                       | 5424                | 5424                | 0                    | 0                         | 1730                  | 1730                        |  |   |                                    |                                 |

EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOB-2.1D 5/11/1995 16:54: 3 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #4 NIGHT INFILTRATION FOR BLDG. #6 POST CHAPEL  
 REPORT- PS-B TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>25.708<br>42.530<br>28/ 9 | NATURAL-GAS<br>133.165<br>308.832<br>28/ 6 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 23.180<br>42.530<br>3/ 8                 | 103.638<br>295.821<br>3/ 6                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 25.230<br>42.189<br>31/20                | 85.981<br>252.719<br>3/ 6                  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 22.257<br>42.189<br>17/ 8                | 28.392<br>173.989<br>5/ 6                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 27.347<br>107.601<br>22/11               | 5.254<br>109.447<br>5/ 6                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 36.030<br>122.057<br>19/11               | 0.000<br>0.000<br>30/ 1                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.452<br>122.727<br>24/11               | 0.000<br>0.000<br>31/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.531<br>126.058<br>21/11               | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 30.074<br>116.587<br>5/11                | 0.000<br>0.000<br>30/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 22.752<br>49.081<br>1/18                 | 23.296<br>165.917<br>20/ 8                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 23.916<br>42.189<br>30/20                | 67.838<br>225.499<br>2/ 6                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 25.671<br>42.530<br>13/ 8                | 122.386<br>294.457<br>14/ 8                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |  |  |
|     | ONE YEAR<br>USE/PEAK                             | 347.149<br>126.058                       | 569.951<br>308.832                         |

| ENERGY TYPE   |  | ELECTRICITY  |  | NATURAL-GAS                   |  |
|---|--|--------------|--|-------------------------------|--|
| IN SITE MBTU -  |  |              |  |                               |  |
| CATEGORY OF USE   |  |              |  |                               |  |
| SPACE HEAT  |  | 21.11        |  | 569.95                        |  |
| SPACE COOL  |  | 74.47        |  | 0.00                          |  |
| HVAC AUX  |  | 145.73       |  | 0.00                          |  |
| DOM HOT WTR   |  | 0.00         |  | 0.00                          |  |
| AUX SOLAR   |  | 0.00         |  | 0.00                          |  |
| LIGHTS  |  | 105.85       |  | 0.00                          |  |
| VERT TRANS  |  | 0.00         |  | 0.00                          |  |
| MISC EQUIP  |  | 0.00         |  | 0.00                          |  |
| TOTAL   |  | 347.16       |  | 569.95                        |  |
| TOTAL SITE ENERGY   |  | 917.10 MBTU  |  | 158.7 KBTU/SQFT-YR GROSS-AREA |  |
| TOTAL SOURCE ENERGY   |  | 1612.44 MBTU |  | 279.0 KBTU/SQFT-YR GROSS-AREA |  |
| PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE =  |  | 0.0          |  | 0.0                           |  |
| PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED   |  | 0.0          |  | 0.0                           |  |
| NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY. |  |              |  |                               |  |



INPUT SYSTEMS ..

\$-----\$  
\$ E Z - D O E S Y S T E M S I N P U T \$  
\$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #5 DAYTIME INFILTRATION FOR BLDG. #6\*

LINE-5 \*POST CHAPEL \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
SYSTEMS-REPORT VERIFICATION=(SV-A)  
SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
SD\_WT\_HT =DAY-SCHEDULE (1,24) (74.) ..  
SD\_SM\_CL =DAY-SCHEDULE (1,24) (72.) ..  
SD\_WT\_CL =DAY-SCHEDULE (1,24) (76.) ..  
SD\_SM\_HT =DAY-SCHEDULE (1,24) (70.) ..  
SD\_OA% =DAY-SCHEDULE (1,5) (0.16)  
 (6,21) (0.)  
 (22,24) (0.16) ..



SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..  
SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..  
SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..  
SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..  
SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..  
SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..  
SW\_OA% =WEEK-SCHEDULE (ALL) SD\_OA% ..

## \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON



S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU AUG 20 SW\_OFF  
 THRU AUG 21 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ ZONE DESCRIPTION

UP-STAIRS =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 8000.  
 SIZING-OPTION = FROM-LOADS ..

BASEMENT =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 BASEBOARD-CTRL = THERMOSTATIC  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

PACK-COOLU =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED OA-CONTROL = FIXED  
 SUPPLY-CFM = 8000. RATED-CFM = 8000.  
 MIN-AIR-SCH = S\_OA% SUPPLY-DELTA-T = 1.8  
 SUPPLY-KW = 0.00059 NIGHT-CYCLE-CTRL = STAY-OFF  
 NIGHT-VENT-DT = 0.0 COOLING-CAPACITY = 240000.  
 COOL-SH-CAP = 180000. COOL-FT-MIN = 0.

HEATING-CAPACITY = -800000. CRANKCASE-MAX-T = 0.  
 OUTSIDE-FAN-T = 45. HEAT-SOURCE = HOT-WATER  
 BASEBOARD-SOURCE = HOT-WATER  
 SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (UP-STAIRS) ..

BB-RADIATN =SYSTEM SYSTEM-TYPE = FPH  
 HEATING-SCHEDULE = S\_HE-SCHED  
 ZONE-NAMES = (BASEMENT) ..

## \$ HOURLY REPORT DESCRIPTION

ZONE-UP-BK =REPORT-BLOCK VARIABLE-TYPE = UP-STAIRS  
 VARIABLE-LIST = (17,18,7,6) ..  
 ZONE-BS-BK =REPORT-BLOCK VARIABLE-TYPE = BASEMENT  
 VARIABLE-LIST = (17,18,7,6) ..  
 AHU-BLK =REPORT-BLOCK VARIABLE-TYPE = PACK-COOLU  
 VARIABLE-LIST = (3,5,6,17) ..  
 BB-BASE-BK =REPORT-BLOCK VARIABLE-TYPE = BB-RADIATN  
 VARIABLE-LIST = (7) ..  
 ZONES-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONE-UP-BK,ZONE-BS-BK)  
 ..  
 SYS-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (AHU-BLK,BB-BASE-BK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #5 DAYTIME INFILTRATION FOR BLDG. #6\*  
 LINE-5 \*POST CHAPEL \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
 SUMMARY=(PS-B,BEPS)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC. DOE-2.1D 5/11/1995 16:59:14 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAYTIME INFILTRATION FOR BLDG. #6POST CHAPEL  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR PACK-COOLU TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -68.372                     | 15                      | -8.F                 | -9.F                 | -225.819                                | 7.709                           |
| FEB   | 0.00000                     |                         |                      |                      | -51.462                     | 3                       | 0.F                  | -1.F                 | -201.794                                | 7.709                           |
| MAR   | 0.00000                     |                         |                      |                      | -41.278                     | 3                       | 15.F                 | 13.F                 | -168.135                                | 7.609                           |
| APR   | 0.00000                     |                         |                      |                      | -13.526                     | 1                       | 32.F                 | 29.F                 | -114.287                                | 7.609                           |
| MAY   | 15.47526                    | 22                      | 11                   | 76.F                 | -2.596                      | 5                       | 44.F                 | 40.F                 | -66.043                                 | 29.836                          |
| JUN   | 38.22856                    | 26                      | 11                   | 82.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 32.041                          |
| JUL   | 51.51688                    | 24                      | 11                   | 82.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 32.253                          |
| AUG   | 49.07655                    | 21                      | 11                   | 88.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 33.356                          |
| SEP   | 24.76225                    | 5                       | 11                   | 78.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 30.604                          |
| OCT   | 0.03261                     | 1                       | 18                   | 83.F                 | -11.183                     | 20                      | 25.F                 | 25.F                 | -110.709                                | 8.780                           |
| NOV   | 0.00000                     |                         |                      |                      | -32.886                     | 3                       | 13.F                 | 12.F                 | -151.900                                | 7.609                           |
| DEC   | 0.00000                     |                         |                      |                      | -61.681                     | 15                      | 3.F                  | 2.F                  | -209.061                                | 7.709                           |
| TOTAL | 179.092                     |                         |                      |                      | -282.985                    |                         |                      |                      | -225.819                                | 33.356                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC. DOE-2.1D 5/11/1995 16:59:14 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAYTIME INFILTRATION FOR BLDG. #6POST CHAPEL  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR PACK-COOLU TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |  |                   |                            |                            |                              |                           |                                      |  | C O I N C I D E N T L O A D S                  |  |  |  |
|--------|---------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|--|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |  |  |
| JAN    | 0                         | 741                      | 0  | 3                 | 744                        | 0                          | 0                            | 0                         | 3                                    | -122.454   | 4.720  |  |  |  |
| FEB    | 0                         | 667                      | 0  | 5                 | 672                        | 0                          | 0                            | 0                         | 5                                    | -112.616   | 4.720  |  |  |  |
| MAR    | 0                         | 733                      | 0  | 11                | 744                        | 0                          | 0                            | 0                         | 11                                   | -113.403   | 4.720  |  |  |  |
| APR    | 0                         | 494                      | 0  | 226               | 720                        | 0                          | 0                            | 0                         | 226                                  | -24.124  | 4.720  |  |  |  |
| MAY    | 359                       | 182                      | 0  | 203               | 744                        | 362                        | 0                            | 0                         | 203                                  | 0.000  | 29.836   |  |  |  |
| JUN    | 695                       | 0                        | 0  | 25                | 720                        | 697                        | 0                            | 0                         | 25                                   | 0.000  | 31.934   |  |  |  |
| JUL    | 744                       | 0                        | 0  | 0                 | 744                        | 744                        | 0                            | 0                         | 0                                    | 0.000  | 32.253   |  |  |  |
| AUG    | 744                       | 0                        | 0  | 0                 | 744                        | 744                        | 0                            | 0                         | 0                                    | 0.000  | 33.356   |  |  |  |
| SEP    | 545                       | 0                        | 0  | 175               | 720                        | 550                        | 0                            | 0                         | 175                                  | 0.000  | 30.604   |  |  |  |
| OCT    | 4                         | 486                      | 0  | 254               | 744                        | 4                          | 0                            | 0                         | 254                                  | 0.000  | 8.780  |  |  |  |
| NOV    | 0                         | 676                      | 0  | 44                | 720                        | 0                          | 0                            | 0                         | 44                                   | -127.211   | 4.720  |  |  |  |
| DEC    | 0                         | 740                      | 0  | 4                 | 744                        | 0                          | 0                            | 0                         | 4                                    | -134.176   | 4.720  |  |  |  |
| ANNUAL | 3091                      | 4719                     | 0  | 950               | 5424                       | 3101                       | 0                            | 0                         | 950                                  |  |  |  |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:59:14 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAYTIME INFILTRATION FOR BLDG. #6POST CHAPEL  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR BB-RADIATN TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                      |         |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|----------------------|---------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | ELEC<br>LOAD<br>(KW) | MAXIMUM |
| JAN   | 0.00000                     |                         |                      |                      | -11.865                     | 4                       | 3                    | 8.F                  | 7.F                                     | 1316.                              | 2.889                |         |
| FEB   | 0.00000                     |                         |                      |                      | -8.782                      | 2                       | 3                    | 13.F                 | 11.F                                    | 1189.                              | 2.889                |         |
| MAR   | 0.00000                     |                         |                      |                      | -6.536                      | 3                       | 4                    | 16.F                 | 13.F                                    | 1316.                              | 2.889                |         |
| APR   | 0.00000                     |                         |                      |                      | -1.436                      | 1                       | 3                    | 36.F                 | 32.F                                    | 1274.                              | 2.889                |         |
| MAY   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1316.                              | 2.889                |         |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1274.                              | 2.889                |         |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1316.                              | 2.889                |         |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1274.                              | 2.889                |         |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1316.                              | 2.889                |         |
| OCT   | 0.00000                     |                         |                      |                      | -0.269                      | 31                      | 5                    | 45.F                 | 40.F                                    | 1316.                              | 2.889                |         |
| NOV   | 0.00000                     |                         |                      |                      | -3.923                      | 30                      | 5                    | 29.F                 | 26.F                                    | 1274.                              | 2.889                |         |
| DEC   | 0.00000                     |                         |                      |                      | -10.505                     | 15                      | 5                    | 8.F                  | 7.F                                     | 1316.                              | 2.889                |         |
| TOTAL | 0.000                       |                         |                      |                      | -43.315                     |                         |                      |                      |   | 15499.                             |                      |         |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      | -34.457                                 |                                    |                      | 2.889   |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:59:14 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAYTIME INFILTRATION FOR BLDG. #6POST CHAPEL  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR BB-RADIATN TOPEKA, KS

| MONTH  | H O U R S                |                          |                            |                   |                            |                            |                     |                     |                   |                           | C O I N C I D E N T L O A D S        |  |  |         |
|--------|--------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|---------------------|---------------------|-------------------|---------------------------|--------------------------------------|--|--|---------|
|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>ON | HOURS<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | MAXIMUM |
| JAN    | 0                        | 744                      | 0                          | 0                 | 744                        | 744                        | 744                 | 744                 | 0                 | 0                         | 0                                    | -15.660  | 0.000  |         |
| FEB    | 0                        | 670                      | 0                          | 2                 | 672                        | 672                        | 672                 | 672                 | 0                 | 0                         | 2                                    | -13.959  | 0.000  |         |
| MAR    | 0                        | 680                      | 0                          | 64                | 744                        | 744                        | 744                 | 744                 | 0                 | 0                         | 64                                   | -14.686  | 0.000  |         |
| APR    | 0                        | 250                      | 0                          | 470               | 720                        | 720                        | 720                 | 720                 | 0                 | 0                         | 470                                  | 0.000  | 0.000  |         |
| MAY    | 0                        | 0                        | 0                          | 744               | 360                        | 744                        | 360                 | 360                 | 0                 | 0                         | 360                                  | 0.000  | 0.000  |         |
| JUN    | 0                        | 0                        | 0                          | 720               | 0                          | 720                        | 0                   | 0                   | 0                 | 0                         | 0                                    | 0.000  | 0.000  |         |
| JUL    | 0                        | 0                        | 0                          | 744               | 0                          | 744                        | 0                   | 0                   | 0                 | 0                         | 0                                    | 0.000  | 0.000  |         |
| AUG    | 0                        | 0                        | 0                          | 744               | 0                          | 744                        | 0                   | 0                   | 0                 | 0                         | 0                                    | 0.000  | 0.000  |         |
| SEP    | 0                        | 0                        | 0                          | 720               | 0                          | 720                        | 0                   | 0                   | 0                 | 0                         | 0                                    | 0.000  | 0.000  |         |
| OCT    | 0                        | 70                       | 0                          | 674               | 720                        | 744                        | 720                 | 720                 | 0                 | 0                         | 650                                  | -8.919   | 0.000  |         |
| NOV    | 0                        | 536                      | 0                          | 184               | 720                        | 720                        | 720                 | 720                 | 0                 | 0                         | 184                                  | -14.610  | 0.000  |         |
| DEC    | 0                        | 744                      | 0                          | 0                 | 744                        | 744                        | 744                 | 744                 | 0                 | 0                         | 0                                    | -16.786  | 0.000  |         |
| ANNUAL | 0                        | 3694                     | 0                          | 5066              | 5424                       | 8760                       | 5424                | 5424                | 0                 | 0                         | 1730                                 |  |  |         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:59:14 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAYTIME INFILTRATION FOR BLDG. #6POST CHAPEL  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>25.666<br>42.715<br>28/ 9 | NATURAL-GAS<br>115.828<br>317.809<br>15/ 3 |
|-----|--|--|--|
| JAN |  |  |  |
|     | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 23.038<br>42.715<br>3/ 8                 | 89.934<br>290.749<br>3/ 4                  |
| FEB |  |  |  |
|     | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 24.765<br>42.373<br>31/10                | 73.714<br>256.792<br>3/ 5                  |
| MAR |  |  |  |
|     | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 21.972<br>42.326<br>1/ 7                 | 24.848<br>182.822<br>1/ 1                  |
| APR |  |  |  |
|     | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 26.526<br>111.737<br>22/11               | 4.739<br>108.843<br>5/ 5                   |
| MAY |  |  |  |
|     | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.352<br>119.264<br>19/11               | 0.000<br>0.000<br>30/ 1                    |
| JUN |  |  |  |
|     | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 38.593<br>119.988<br>24/11               | 0.000<br>0.000<br>31/ 1                    |
| JUL |  |  |  |
|     | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 38.367<br>123.755<br>21/11               | 0.000<br>0.000<br>31/ 1                    |
| AUG |  |  |  |
|     | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 28.698<br>114.359<br>5/11                | 0.000<br>0.000<br>30/ 1                    |
| SEP |  |  |  |
|     | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 22.469<br>41.233<br>31/ 7                | 19.751<br>161.357<br>20/ 5                 |
| OCT |  |  |  |
|     | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 23.470<br>42.373<br>30/11                | 57.764<br>224.784<br>3/ 3                  |
| NOV |  |  |  |
|     | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 25.513<br>42.715<br>13/ 8                | 105.912<br>303.206<br>15/ 5                |
| DEC |  |  |  |
|     | ONE YEAR<br>USE/PEAK                             | 332.428<br>123.755                       | 492.490<br>317.809                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/11/1995 16:59:14 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAYTIME INFILTRATION FOR BLDG. #6POST CHAPEL  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

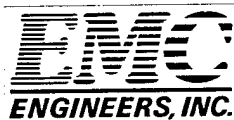
| ENERGY TYPE   | ELECTRICITY  | NATURAL-GAS                   |                    |          |
|---|--------------|-------------------------------|--------------------|----------|
| IN SITE MBTU -  |              |                               |                    |          |
| CATEGORY OF USE   |              |                               |                    |          |
| SPACE HEAT  | 19.36        | 492.49                        |                    |          |
| SPACE COOL  | 61.59        | 0.00                          |                    |          |
| HVAC AUX  | 145.62       | 0.00                          |                    |          |
| DOM HOT WTR   | 0.00         | 0.00                          |                    |          |
| AUX SOLAR   | 0.00         | 0.00                          |                    |          |
| LIGHTS  | 105.85       | 0.00                          |                    |          |
| VERT TRANS  | 0.00         | 0.00                          |                    |          |
| MISC EQUIP  | 0.00         | 0.00                          |                    |          |
|   | -----        | -----                         |                    |          |
| TOTAL   | 332.43       | 492.49                        |                    |          |
|   |              |                               |                    |          |
| TOTAL SITE ENERGY   | 824.92 MBTU  | 142.7 KBTU/SQFT-YR GROSS-AREA | 142.7 KBTU/SQFT-YR | NET-AREA |
| TOTAL SOURCE ENERGY   | 1490.77 MBTU | 257.9 KBTU/SQFT-YR GROSS-AREA | 257.9 KBTU/SQFT-YR | NET-AREA |
| PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE  | = 0.0        |                               |                    |          |
| PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED   | = 0.0        |                               |                    |          |
| NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY. |              |                               |                    |          |



**COMPUTER ENERGY SIMULATIONS**

**BLDG. 7665  
CLINIC BUILDINGS**





DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

BUILDING NO.: 7665  
BLDG. TYPE: DENTAL CLINIC

### ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3    | RUN4    | RUN5    |
|----------------|---------|---------|---------|---------|---------|---------|
| HEATING (MBtu) | 345.8   | 234.6   | 221.2   | 569.1   | 149.9   | 281.2   |
| COOLING (KWH)  | 284,840 | 266,223 | 279,159 | 251,360 | 280,117 | 282,411 |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 20,280 CFM                        |
| FLOOR AREA     | 9,645 FT <sup>2</sup>             |
| CFMI           | 608 CFM                           |
| UA             | 3089 BTU/HR-°F                    |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

| EZDOE COMPUTER RUN DEFINITION: |                             |
|--------------------------------|-----------------------------|
| BASERUN                        | EXISTING OPERATION          |
| RUN1                           | NIGHT SETBACK               |
| RUN2                           | DDC CONTROL                 |
| RUN3                           | ECONOMIZER                  |
| RUN4                           | NIGHTTIME INFILTRATION (OA) |
| RUN5                           | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      | ANNUAL HEATING & COOLING HOURS |                            |
|--------------------|-------------------|------|--------------------------------|----------------------------|
| M-F                | 800               | 1700 | 45 HR                          | HR. ON HEATING 1459 HR/YR  |
| SAT.               | 0                 | 0    | 0 HR                           | HR. ON COOLING 887 HR/YR   |
| SUN.               | 0                 | 0    | 0 HR                           | HR. OFF HEATING 3989 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 45 HR/WK                       | HR. OFF COOLING 2425 HR/YR |
|                    | TOTAL UNOCC. HR.  |      | 123 HR/WK                      |                            |
|                    | ANNUAL OCCUPY HR. |      | 2346 HR/YR                     |                            |
|                    | ANNUAL UNOCC. HR. |      | 6414 HR/YR                     |                            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING

8760 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY

5448 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

3312 HR/YR

HRS SAVED (HTG ONLY)

5448

1459

=

3989 HR/YR

HRS SAVED (CLG ONLY)

3312

887

=

2425 HR/YR

|           |   |   |               |           |                     |
|-----------|---|---|---------------|-----------|---------------------|
| HOAUHC    | 345.82 MBtu   | - | 149.92 MBtu   | =         | 5.02E+01 Btu/CFM-HR |
|           | 608.4 CFM   | x | 6414 HR/YR    | =         |                     |
| HOAUH     | 345.82 MBtu   | - | 149.92 MBtu   | =         | 8.07E+01 Btu/CFM-HR |
|           | 608.4 CFM   | x | 3989 HR/YR    | =         |                     |
| COAUHC    | 284,840.3 KWH   | - | 280,117.2 KWH | =         | 1.21E-03 KWH/CFM-HR |
|           | 608.4 CFM   | x | 6414 HR/YR    | =         |                     |
| COAUC     | 284,840.3 KWH   | - | 280,117.2 KWH | =         | 3.20E-03 KWH/CFM-HR |
|           | 608.4 CFM   | x | 2425 HR/YR    | =         |                     |
| HOAOHC    | 345.82 MBtu   | - | 281.22 MBtu   | =         | 4.53E+01 Btu/CFM-HR |
|           | 608.4 CFM   | x | 2346 HR/YR    | =         |                     |
| HOAOH     | 345.82 MBtu   | - | 281.22 MBtu   | =         | 7.28E+01 Btu/CFM-HR |
|           | 608.4 CFM   | x | 1459 HR/YR    | =         |                     |
| COAOHC    | 284,840.3 KWH   | - | 282,411.4 KWH | =         | 1.70E-03 KWH/CFM-HR |
|           | 608.4 CFM   | x | 2346 HR/YR    | =         |                     |
| COAOC     | 284,840.3 KWH   | - | 282,411.4 KWH | =         | 4.50E-03 KWH/CFM-HR |
|           | 608.4 CFM   | x | 887 HR/YR     | =         |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | =         | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | =         | 0.17                |
| ECC       | 266,223.3 KWH   | - | 251,359.5 KWH | =         | 8.26E-04 KWH/CFM-HR |
|           | 20280 CFM   | x | 887 HR/YR     | =         |                     |
| ECHC      | 266,223.3 KWH   | - | 251,359.5 KWH | =         | 3.12E-04 KWH/CFM-HR |
|           | 20280 CFM   | x | 2346 HR/YR    | =         |                     |
| NSUCHC    | 284,840.3 KWH   | - | 266,223.3 KWH | =         | 1.43E-04 KWH/CFM-HR |
|           | 20280 CFM   | x | 6414 HR/YR    | =         |                     |
| NSUCC     | 284,840.3 KWH   | - | 266,223.3 KWH | =         | 3.79E-04 KWH/CFM-HR |
|           | 20280 CFM   | x | 2425 HR/YR    | =         |                     |
| DDCCHC    | 284,840.3 KWH   | - | 279,159.1 KWH | =         | 1.19E-04 KWH/CFM-HR |
|           | 20280 CFM   | x | 2346 HR/YR    | =         |                     |
| DDCCC     | 284,840.3 KWH   | - | 279,159.1 KWH | =         | 3.16E-04 KWH/CFM-HR |
|           | 20280 CFM   | x | 887 HR/YR     | =         |                     |
| NSC       | 345.82 MBtu   | - | 234.55 MBtu   | =         | 3.60E+04 Btu/UA     |
|           | 3088.631 UA   |   |               | =         |                     |
| DDCH      | 345.82 MBtu   | - | 221.22 MBtu   | =         | 4.03E+04 Btu/UA     |
|           | 3088.631 UA   |   |               | =         |                     |
| OPT       | (2 HR/DAY X 240 DAY/YR)                               |   |               | 175 HR/YR |                     |
|           |   |   |               | =         | 305 HR/YR           |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               | =         | 17.5 KWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01          | =         | 5.67 HR/YR          |



INPUT LOADS ..

```

$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

```

```

LINE-4 *BASELINE SIMULATION FOR BLDG.#7665      *
LINE-5 *DENTAL CLINIC                          * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ...
LOADS-REPORT VERIFICATION=(LV-D)
            SUMMARY=(LS-C,LS-D)
            HOURLY-DATA-SAVE = YES ..
BUILDING-LOCATION LATITUDE = 39.0
                LONGITUDE = 96.5
                ALTITUDE = 1065.
                TIME-ZONE = 6
                GROSS-AREA = 9660
                SHIELDING-COEF = 0.29
                X-REF = 0.0
                Y-REF = 0.0 ..
RUN-PERIOD  JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

```
LD_OFF      =DAY-SCHEDULE (1,24) (0.) ..

```

```
LD_FULL_ON =DAY-SCHEDULE (1,24) (1.) ..

```

```
LD_7545M-F =DAY-SCHEDULE (1,6) (0.)
                  (7) (0.5)
                  (8,16) (1.)
                  (17) (0.5)
                  (18,24) (0.) ..

```

```
LW_OFF      =WEEK-SCHEDULE (ALL) LD_OFF ..

```

```
LW_FULL_ON =WEEK-SCHEDULE (ALL) LD_FULL_ON ..

```

```
LW_7545M-F =WEEK-SCHEDULE (WD) LD_7545M-F
                  (WEH) LD_OFF ..

```

```
L_FULL-OFF =SCHEDULE THRU DEC 31 LW_OFF ..

```

L\_FULL\_ON =SCHEDULE THRU DEC 31 LW\_FULL\_ON ..

\$ M-F\_7:30-4:30

L\_M-F7545 =SCHEDULE THRU DEC 31 LW\_7545M-F ..

# \$ CONSTRUCTION TYPES

## \$ BUILT UP ROOF ON METAL DECKING

ROOF-1 =CONSTRUCTION LAYERS = ASHR-17  
ABSORPTANCE = 0.500  
ROUGHNESS = 1 ..

## \$ EXTERIOR WALL CONSTRUCTION

WALL-1 =LAYERS MATERIAL=(CM03,AL11,PW05,IN23,GP02) I-F-R= 0.6100  
THICKNESS=(0.083,0.000,0.063,0.167,0.052) ..  
EXWALL-1 =CONSTRUCTION LAYERS = WALL-1  
ROUGHNESS = 2 ..

## \$ INTERIOR WALL CONSTRUCTION

IW\_LAYER =LAYERS MATERIAL=(GP01,WD01,AL21,GP01)  
THICKNESS=(0.042,0.063,0.000,0.042) ..  
INWALL =CONSTRUCTION LAYERS = IW\_LAYER  
ROUGHNESS = 5 ..

## \$ DOOR CONSTRUCTION

DOORCON =CONSTRUCTION U-VALUE = 0.400 ..

## \$ SLAB FLOOR

FLOOR =CONSTRUCTION U-VALUE = 0.020  
ABSORPTANCE = 0.750  
ROUGHNESS = 5 ..

## \$ HEAVY CONCRETE WALL

VAULT =CONSTRUCTION LAYERS = ASHI-21 ..

## \$ BUILT UP ROOF W/OUT DROP CEILING

ASHR-17A =LAYERS MATERIAL=(HF-E2,HF-E3,HF-B6,HF-A3)  
THICKNESS=(0.042,0.031,0.167,0.005) ..  
ROOF-2 =CONSTRUCTION LAYERS = ASHR-17A  
ABSORPTANCE = 0.500  
ROUGHNESS = 1 ..

## \$ BUILT UP ROOF W/ INSUL ON DROP CL

ASHR-17B =LAYERS MATERIAL=(HF-E2,HF-E3,HF-A3,HF-E4,IN01,HF-E5)  
THICKNESS=(0.042,0.031,0.005,0.000,0.188,0.063) ..  
ROOF-3 =CONSTRUCTION LAYERS = ASHR-17B  
ABSORPTANCE = 0.850  
ROUGHNESS = 1 ..

## \$ EXTERIOR WALL CONSTRUCTION TYPE-2

WALL-2 =LAYERS MATERIAL=(BK01,AL11,CB06,AL11,GP01) I-F-R= 0.6100

```

                                THICKNESS=(0.333,0.000,0.500,0.000,0.042) ..
EXWALL-2 =CONSTRUCTION    LAYERS = WALL-2
                                ABSORPTANCE = 0.880
                                ROUGHNESS = 2 ..

1_PN_STD =GLASS-TYPE      GLASS-TYPE-CODE = 1
                                PANES = 1 ..
GTYPE_2 =GLASS-TYPE      SHADING-COEF = 0.300
                                PANES = 1
                                GLASS-CONDUCTANCE = 0.790 ..
GTYPE_3 =GLASS-TYPE      SHADING-COEF = 0.400
                                PANES = 1
                                GLASS-CONDUCTANCE = 0.360 ..
2_PN_STD =GLASS-TYPE      GLASS-TYPE-CODE = 1
                                PANES = 2 ..

```

## \$ SPACE DESCRIPTION

```

SPACE_1  =SPACE    AREA = 2295.0  VOLUME = 18360.0
                                TEMPERATURE = (73.)  ZONE-TYPE = CONDITIONED
                                PEOPLE-SCHEDULE = L_M-F7545  AREA/PERSON = 420.0
                                PEOPLE-HG-LAT = 625.0  PEOPLE-HG-SENS = 375.0
                                LIGHTING-TYPE = SUS-FLUOR  LIGHTING-KW = 9.73
                                LIGHT-TO-SPACE = 1.0  LIGHTING-SCHEDULE = L_M-F7545
                                EQUIP-SCHEDULE = L_M-F7545  EQUIPMENT-W/SQFT = 1.8
                                FURN-WEIGHT = 1.  INF-METHOD = NONE ..

E-W      HEIGHT = 8.0  WIDTH = 168.0  CONS = EXWALL-2
                                AZIMUTH = 295 ..

WINDOW HEIGHT = 4.0  WIDTH = 6.0  G-T = 2_PN_STD
                                MULTIPLIER = 13.0  SETBACK = 0.3
                                SHADING-DIVISION = 8  OVERHANG-A = 4.
                                OVERHANG-B = 2.  OVERHANG-W = 14.  OVERHANG-D = 1.5 ..

U-W      HEIGHT = 153.0  WIDTH = 15.0  CONS = FLOOR ..

ROOF     HEIGHT = 153.0  WIDTH = 15.0  CONS = ROOF-3
                                TILT = 0 ..

SPACE_2  =SPACE    AREA = 2295.0  VOLUME = 18360.0
                                TEMPERATURE = (73.)  ZONE-TYPE = CONDITIONED
                                PEOPLE-SCHEDULE = L_M-F7545  AREA/PERSON = 420.0
                                PEOPLE-HG-LAT = 625.0  PEOPLE-HG-SENS = 375.0
                                LIGHTING-TYPE = SUS-FLUOR  LIGHTING-KW = 9.76
                                LIGHT-TO-SPACE = 1.0  LIGHTING-SCHEDULE = L_M-F7545
                                EQUIP-SCHEDULE = L_M-F7545  EQUIPMENT-W/SQFT = 1.8
                                FURN-WEIGHT = 1.  INF-METHOD = NONE ..

E-W      HEIGHT = 8.0  WIDTH = 168.0  CONS = EXWALL-2
                                AZIMUTH = 115 ..

```

WINDOW HEIGHT = 4.0 WIDTH = 3.3 G-T = 2\_PN\_STD  
 MULTIPLIER = 15.0 SETBACK = 0.3  
 SHADING-DIVISION = 8 OVERHANG-A = 4.  
 OVERHANG-B = 2. OVERHANG-W = 11.3  
 OVERHANG-D = 1.5 ..

U-W HEIGHT = 153.0 WIDTH = 15.0 CONS = FLOOR ..

ROOF HEIGHT = 153.0 WIDTH = 15.0 CONS = ROOF-3  
 TILT = 0 ..

SPACE\_3 =SPACE AREA = 630.0 VOLUME = 5104.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_M-F7545 AREA/PERSON = 420.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-KW = 2.65  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_M-F7545  
 EQUIP-SCHEDULE = L\_M-F7545 EQUIPMENT-W/SQFT = 0.36  
 FURN-WEIGHT = 1. INF-METHOD = NONE ..

E-W HEIGHT = 8.0 WIDTH = 57.5 CONS = EXWALL-2  
 AZIMUTH = 25 ..

WINDOW HEIGHT = 4.0 WIDTH = 3.3 G-T = 2\_PN\_STD  
 MULTIPLIER = 3.0 SETBACK = 0.3  
 SHADING-DIVISION = 8 OVERHANG-A = 4.  
 OVERHANG-B = 2. OVERHANG-W = 11.3  
 OVERHANG-D = 1.5 ..

U-W HEIGHT = 42.5 WIDTH = 15.0 CONS = FLOOR ..

ROOF HEIGHT = 42.5 WIDTH = 15.0 CONS = ROOF-3  
 TILT = 0 ..

SPACE\_4 =SPACE AREA = 630.0 VOLUME = 5104.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_M-F7545 AREA/PERSON = 420.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-KW = 2.36  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_M-F7545  
 EQUIP-SCHEDULE = L\_M-F7545 EQUIPMENT-W/SQFT = 0.36  
 FURN-WEIGHT = 1. INF-METHOD = NONE ..

E-W HEIGHT = 8.0 WIDTH = 57.5 CONS = EXWALL-2  
 AZIMUTH = 205 ..

WINDOW HEIGHT = 6.5 WIDTH = 4.0 G-T = 2\_PN\_STD  
 MULTIPLIER = 3.0 SETBACK = 0.3  
 SHADING-DIVISION = 8 OVERHANG-A = 4.  
 OVERHANG-B = 2. OVERHANG-W = 12. OVERHANG-D = 1.5 ..

U-W HEIGHT = 42.5 WIDTH = 15.0 CONS = FLOOR ..

ROOF HEIGHT = 42.5 WIDTH = 15.0 CONS = ROOF-3

TILT = 0 ..

SPACE\_5 =SPACE AREA = 3795.0 VOLUME = 30360.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_M-F7545 AREA/PERSON = 420.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-KW = 11.64  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_M-F7545  
 EQUIP-SCHEDULE = L\_M-F7545 EQUIPMENT-W/SQFT = 0.36  
 FURN-WEIGHT = 1. INF-METHOD = NONE ..

ROOF HEIGHT = 138.0 WIDTH = 27.5 CONS = ROOF-3  
 TILT = 0 ..

U-W HEIGHT = 138.0 WIDTH = 27.5 CONS = FLOOR ..

PLENUM\_6 =SPACE AREA = 9660.0 VOLUME = 28980.0  
 TEMPERATURE = (73.) ZONE-TYPE = PLENUM  
 PEOPLE-SCHEDULE = L\_FULL-OFF AREA/PERSON = 420.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHT-TO-SPACE = 1.0  
 LIGHTING-SCHEDULE = L\_FULL-OFF  
 EQUIP-SCHEDULE = L\_FULL-OFF FLOOR-WEIGHT = 0.3  
 INF-METHOD = NONE ..

E-W HEIGHT = 3.0 WIDTH = 168.0 CONS = EXWALL-2  
 AZIMUTH = 295 ..

E-W HEIGHT = 3.0 WIDTH = 168.0 CONS = EXWALL-2  
 AZIMUTH = 115 ..

E-W HEIGHT = 3.0 WIDTH = 57.5 CONS = EXWALL-2  
 AZIMUTH = 205 ..

E-W HEIGHT = 3.0 WIDTH = 57.5 CONS = EXWALL-2  
 AZIMUTH = 25 ..

ROOF HEIGHT = 57.5 WIDTH = 168.0 CONS = ROOF-3  
 TILT = 0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

\$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*

LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*

LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*BASELINE SIMULATION FOR BLDG.#7665 \*

LINE-5 \*DENTAL CLINIC \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_FULL =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_OA% =DAY-SCHEDULE (1,24) (0.03) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,24) (74.2) ..  
 SD\_SM\_HT =DAY-SCHEDULE (1,24) (71.8) ..  
 SD\_OA\_% =DAY-SCHEDULE (1,24) (0.03) ..

SW\_FULL\_ON =WEEK-SCHEDULE (ALL) SD\_FULL ..

SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..

SW\_OA% =WEEK-SCHEDULE (ALL) SD\_OA% ..

SW\_off =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..

SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..

S\_FULL\_ON =SCHEDULE THRU DEC 31 SW\_FULL\_ON ..

S\_FULL\_OFF =SCHEDULE THRU DEC 31 SW\_off ..

## \$ HEATING SET TEMP

S\_HEAT\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

S\_OTSIDAIR =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HE\_SCHED =SCHEDULE THRU MAY 15 SW\_FULL\_ON  
 THRU OCT 1 SW\_off  
 THRU DEC 31 SW\_FULL\_ON ..

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_off  
 THRU OCT 1 SW\_FULL\_ON  
 THRU DEC 31 SW\_off ..



## \$ COOLING SET TEMP

S\_COOL\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_off  
THRU JAN 15 SW\_FULL\_ON  
THRU AUG 11 SW\_off  
THRU AUG 12 SW\_FULL\_ON  
THRU DEC 31 SW\_off ..

## \$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_4 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_5 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

PLENUM\_6 =ZONE DESIGN-HEAT-T = 72.0 DESIGN-COOL-T = 74.0  
ZONE-TYPE = PLENUM SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ\_W/DX =SYSTEM SYSTEM-TYPE = PMZS  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE\_SCHED  
COOLING-SCHEDULE = S\_CL\_SCHED MAX-HUMIDITY = 60.0  
MIN-HUMIDITY = 50.0 OA-CONTROL = FIXED

```

SUPPLY-CFM = 19500.  RATED-CFM = 19500.
MIN-AIR-SCH = S_OTSIDAIR  FAN-SCHEDULE = S_FULL_ON
SUPPLY-DELTA-T = 2.1  SUPPLY-KW = 0.00069
NIGHT-CYCLE-CTRL = STAY-OFF  MIN-CFM-RATIO = 1.0
COOLING-CAPACITY = 664700.
HEATING-CAPACITY = -450000.  CRANKCASE-HEAT = 3.73
CRANKCASE-MAX-T = 0.  OUTSIDE-FAN-T = 45.
HEAT-SOURCE = HOT-WATER  HUMIDIFIER-TYPE = HOT-WATER
ZONE-NAMES = (SPACE_1, SPACE_2, SPACE_3, SPACE_4,
              SPACE_5, PLENUM_6) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

AUH-BLK  =REPORT-BLOCK VARIABLE-TYPE = MZ_W/DX
          VARIABLE-LIST = (3,5,6,17) ..
S_ZON-BLK =REPORT-BLOCK VARIABLE-TYPE = SPACE_4
          VARIABLE-LIST = (17,18,7,6) ..
N_ZON-BLK =REPORT-BLOCK VARIABLE-TYPE = SPACE_3
          VARIABLE-LIST = (17,18,7,6) ..
AHU-HRLY  = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (AUH-BLK)
..
ZONES-HRLY = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (S_ZON-BLK,N_ZON-BLK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *
        LINE-4 *BASELINE SIMULATION FOR BLDG.#7665      *
        LINE-5 *DENTAL CLINIC      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
PLANT-REPORT  VERIFICATION=(PV-A)
              SUMMARY=(PS-B,BEPS)
              HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_heaton  =DAY-SCHEDULE  (1,24) (1.) ..
Pd_heatoff =DAY-SCHEDULE  (1,24) (0.) ..

```

PD\_coolon =DAY-SCHEDULE (1,24) (1.) ..

PD\_cooloff =DAY-SCHEDULE (1,24) (0.) ..

PW\_heaton =WEEK-SCHEDULE (ALL) PD\_heaton ..

PW\_heatoff =WEEK-SCHEDULE (ALL) Pd\_heatoff ..

Pw\_coolon =WEEK-SCHEDULE (ALL) PD\_coolon ..

Pw\_cooloff =WEEK-SCHEDULE (ALL) PD\_cooloff ..

PHeat =SCHEDULE THRU MAY 15 PW\_heaton  
THRU OCT 1 PW\_heatoff  
THRU DEC 31 PW\_heaton ..

PCool =SCHEDULE THRU MAY 15 Pw\_cooloff  
THRU OCT 1 Pw\_coolon  
THRU DEC 31 Pw\_cooloff ..

#### \$ EQUIPMENT DESCRIPTION

STM-PLANT =PLANT-EQUIPMENT TYPE = STM-BOILER  
SIZE = -999. ..

COOL-PLANT =PLANT-EQUIPMENT TYPE = HERM-REC-CHLR  
SIZE = -999. INSTALLED-NUMBER = 2  
MAX-NUMBER-AVAIL = 2 ..

PLANT-PARAMETERS BOILER-FUEL = NATURAL-GAS STM-BOILER-HIR = 1.33  
HW-BOILER-HIR = 1.0 TWR-WTR-SET-POINT = 85.  
TWR-PUMP-HEAD = 45. TWR-FAN-LOW-CFM = 1.0  
TWR-DESIGN-WETBULB = 77. CHILL-WTR-T = 45.  
CCIRC-MOTOR-EFF = 0.75 CCIRC-HEAD = 0.0  
HCIRC-MOTOR-EFF = 0.75 HCIRC-HEAD = 0.0  
HCIRC-DESIGN-T-DROP = 20.0 ..

PART-LOAD-RATIO TYPE = STM-BOILER  
MIN-RATIO = 0.2500 MAX-RATIO = 1.0000  
OPERATING-RATIO = 1.0000 ELEC-INPUT-RATIO = 0.0220 ..

PART-LOAD-RATIO TYPE = COOLING-TWR  
ELEC-INPUT-RATIO = 0.0191 ..

ENERGY-RESOURCE RESOURCE = ELECTRICITY ..  
ENERGY-RESOURCE RESOURCE = NATURAL-GAS ..

HEAT =LOAD-ASSIGNMENT TYPE = HEATING  
OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = STM-PLANT  
NUMBER = 1 ..

COOL =LOAD-ASSIGNMENT TYPE = COOLING  
OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = COOL-PLANT  
NUMBER = 2 ..

END ..  
COMPUTE PLANT ..  
STOP ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 8:42:27 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG.#7665 DENTAL CLINIC  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

NUMBER OF EXTERIOR SURFACES 14 RECTANGULAR 14 OTHER 0  
 (U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED )

| SURFACE  | SPACE | U-VALUE<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | WALL<br>AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | WALL<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) | AZIMUTH   |
|----------|-------|----------------------------|-------------------------|----------------------------|------------------------|----------------------------|-------------------------|----------------------------|------------------------|--------------------------------|-----------|
| SPACE 3  |       | 0.490                      | 39.60                   | 0.209                      | 420.40                 | 0.233                      | 460.00                  | 0.209                      | 460.00                 | 460.00                         | NORTH     |
| PLENUM 6 |       | 0.000                      | 0.00                    | 0.209                      | 172.50                 | 0.209                      | 172.50                  | 0.209                      | 172.50                 | 172.50                         | NORTH     |
| PLENUM 6 |       | 0.000                      | 0.00                    | 0.209                      | 504.00                 | 0.209                      | 504.00                  | 0.209                      | 504.00                 | 504.00                         | EAST      |
| SPACE 2  |       | 0.490                      | 198.00                  | 0.209                      | 1146.00                | 0.251                      | 1344.00                 | 0.209                      | 1344.00                | 1344.00                        | EAST      |
| PLENUM 6 |       | 0.000                      | 0.00                    | 0.209                      | 172.50                 | 0.209                      | 172.50                  | 0.209                      | 172.50                 | 172.50                         | SOUTH     |
| SPACE 4  |       | 0.490                      | 78.00                   | 0.209                      | 382.00                 | 0.257                      | 460.00                  | 0.209                      | 460.00                 | 460.00                         | SOUTH     |
| PLENUM 6 |       | 0.000                      | 0.00                    | 0.209                      | 504.00                 | 0.209                      | 504.00                  | 0.209                      | 504.00                 | 504.00                         | WEST      |
| SPACE 1  |       | 0.490                      | 312.00                  | 0.209                      | 1032.00                | 0.274                      | 1344.00                 | 0.209                      | 1344.00                | 1344.00                        | WEST      |
| SPACE 5  |       | 0.000                      | 0.00                    | 0.087                      | 3795.00                | 0.087                      | 3795.00                 | 0.087                      | 3795.00                | 3795.00                        | ROOF      |
| SPACE 1  |       | 0.000                      | 0.00                    | 0.087                      | 2295.00                | 0.087                      | 2295.00                 | 0.087                      | 2295.00                | 2295.00                        | ROOF      |
| SPACE 3  |       | 0.000                      | 0.00                    | 0.087                      | 637.50                 | 0.087                      | 637.50                  | 0.087                      | 637.50                 | 637.50                         | ROOF      |
| SPACE 2  |       | 0.000                      | 0.00                    | 0.087                      | 2295.00                | 0.087                      | 2295.00                 | 0.087                      | 2295.00                | 2295.00                        | ROOF      |
| SPACE 4  |       | 0.000                      | 0.00                    | 0.087                      | 637.50                 | 0.087                      | 637.50                  | 0.087                      | 637.50                 | 637.50                         | ROOF      |
| PLENUM 6 |       | 0.000                      | 0.00                    | 0.087                      | 9660.00                | 0.087                      | 9660.00                 | 0.087                      | 9660.00                | 9660.00                        | ROOF      |
| SPACE 1  |       | 0.000                      | 0.00                    | 0.020                      | 2295.00                | 0.020                      | 2295.00                 | 0.020                      | 2295.00                | 2295.00                        | UNDERGRND |
| SPACE 2  |       | 0.000                      | 0.00                    | 0.020                      | 2295.00                | 0.020                      | 2295.00                 | 0.020                      | 2295.00                | 2295.00                        | UNDERGRND |
| SPACE 3  |       | 0.000                      | 0.00                    | 0.020                      | 637.50                 | 0.020                      | 637.50                  | 0.020                      | 637.50                 | 637.50                         | UNDERGRND |
| SPACE 4  |       | 0.000                      | 0.00                    | 0.020                      | 637.50                 | 0.020                      | 637.50                  | 0.020                      | 637.50                 | 637.50                         | UNDERGRND |
| SPACE 5  |       | 0.000                      | 0.00                    | 0.020                      | 3795.00                | 0.020                      | 3795.00                 | 0.020                      | 3795.00                | 3795.00                        | UNDERGRND |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 8:42:27 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG.#7665 DENTAL CLINIC  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

|             | AVERAGE<br>U-VALUE/GLASS<br>(BTU/HR-SQFT-F) | AVERAGE<br>U-VALUE/WALLS<br>(BTU/HR-SQFT-F) | AVERAGE U-VALUE<br>WALLS+GLASS<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | OPAQUE<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) |
|-------------|---|---|---|-------------------------|--------------------------|--------------------------------|
| NORTH       | 0.490                                       | 0.209                                       | 0.227   | 39.60                   | 592.90                   | 632.50                         |
| EAST        | 0.490                                       | 0.209                                       | 0.239   | 198.00                  | 1650.00                  | 1848.00                        |
| SOUTH       | 0.490                                       | 0.209                                       | 0.244   | 78.00                   | 554.50                   | 632.50                         |
| WEST        | 0.490                                       | 0.209                                       | 0.257   | 312.00                  | 1536.00                  | 1848.00                        |
| ROOF        | 0.000                                       | 0.087                                       | 0.087   | 0.00                    | 19320.00                 | 19320.00                       |
| ALL WALLS   | 0.490                                       | 0.209                                       | 0.245   | 627.60                  | 4333.40                  | 4961.00                        |
| WALLS+ROOFS | 0.490                                       | 0.109                                       | 0.119   | 627.60                  | 23653.40                 | 24281.00                       |
| UNDERGRND   | 0.000                                       | 0.020                                       | 0.020   | 0.00                    | 9660.00                  | 9660.00                        |
| BUILDING    | 0.490                                       | 0.083                                       | 0.091   | 627.60                  | 33313.40                 | 33941.00                       |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 8:42:27 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG.#7665 DENTAL CLINIC  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ\_W/DX TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                            |                                 |        |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|--------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |        |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -38.011                     | 15                      | 8                    | -6.F                 | -7.F                                    | -168.369                           | 19885.                          | 63.387 |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -23.798                     | 3                       | 6                    | -1.F                 | -2.F                                    | -132.328                           | 17843.                          | 63.387 |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -22.495                     | 6                       | 7                    | 19.F                 | 18.F                                    | -107.885                           | 20637.                          | 59.657 |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -26.800                     | 22                      | 18                   | 67.F                 | 52.F                                    | -89.616                            | 19390.                          | 59.657 |
| MAY   | 48.22987                    | 16                      | 4                    | 60.F                 | 58.F                                    | -16.357                     | 13                      | 18                   | 80.F                 | 66.F                                    | -98.800                            | 24412.                          | 95.141 |
| JUN   | 98.47421                    | 28                      | 16                   | 90.F                 | 76.F                                    | 0.000                       |                         |                      |                      |   | 0.000                              | 29769.                          | 92.743 |
| JUL   | 109.91195                   | 13                      | 16                   | 93.F                 | 77.F                                    | 0.000                       |                         |                      |                      |   | 0.000                              | 30552.                          | 95.026 |
| AUG   | 113.19754                   | 22                      | 16                   | 96.F                 | 77.F                                    | 0.000                       |                         |                      |                      |   | 0.000                              | 32646.                          | 97.691 |
| SEP   | 78.58515                    | 7                       | 16                   | 93.F                 | 76.F                                    | 0.000                       |                         |                      |                      |   | 0.000                              | 27234.                          | 93.694 |
| OCT   | 0.96727                     | 1                       | 18                   | 83.F                 | 68.F                                    | -24.237                     | 6                       | 18                   | 67.F                 | 52.F                                    | -82.919                            | 19352.                          | 59.657 |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -19.656                     | 13                      | 6                    | 25.F                 | 24.F                                    | -88.392                            | 18928.                          | 59.657 |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -30.216                     | 12                      | 6                    | 3.F                  | 2.F                                     | -145.035                           | 19717.                          | 63.387 |
| TOTAL | 449.366                     |                         |                      |                      |   | -201.571                    |                         |                      |                      |   | -168.369                           | 280366.                         | 97.691 |
| MAX   |                             |                         |                      |                      | 461.241                                 |                             |                         |                      |                      |   |                                    |                                 |        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 8:42:27 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG.#7665 DENTAL CLINIC  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ\_W/DX TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |  |                   |                            |                            |                  |                              |                           |                                      | C O I N C I D E N T L O A D S                      |  |
|--------|---------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------|------------------------------|---------------------------|--------------------------------------|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0                         | 744                      | 0  | 0                 | 744                        | 0                          | 744              | 0                            | 0                         | 0                                    | -29.292  | 13.455   |
| FEB    | 0                         | 672                      | 0  | 0                 | 672                        | 0                          | 672              | 0                            | 0                         | 0                                    | -26.311  | 13.455   |
| MAR    | 0                         | 744                      | 0  | 0                 | 744                        | 0                          | 744              | 0                            | 0                         | 0                                    | -33.254  | 13.455   |
| APR    | 0                         | 720                      | 0  | 0                 | 720                        | 0                          | 720              | 0                            | 0                         | 0                                    | -49.273  | 13.455   |
| MAY    | 384                       | 360                      | 0  | 0                 | 360                        | 384                        | 744              | 0                            | 0                         | 0                                    | 0.000  | 53.245   |
| JUN    | 720                       | 0                        | 0  | 0                 | 0                          | 720                        | 720              | 0                            | 0                         | 0                                    | 0.000  | 92.743   |
| JUL    | 744                       | 0                        | 0  | 0                 | 0                          | 744                        | 744              | 0                            | 0                         | 0                                    | 0.000  | 95.026   |
| AUG    | 744                       | 0                        | 0  | 0                 | 0                          | 744                        | 744              | 0                            | 0                         | 0                                    | 0.000  | 96.162   |
| SEP    | 709                       | 0                        | 0  | 0                 | 0                          | 744                        | 720              | 0                            | 0                         | 11                                   | 0.000  | 93.694   |
| OCT    | 21                        | 720                      | 0  | 3                 | 720                        | 24                         | 744              | 0                            | 0                         | 3                                    | 0.000  | 23.729   |
| NOV    | 0                         | 720                      | 0  | 0                 | 720                        | 0                          | 720              | 0                            | 0                         | 0                                    | -32.826  | 13.455   |
| DEC    | 0                         | 744                      | 0  | 0                 | 744                        | 0                          | 744              | 0                            | 0                         | 0                                    | -91.653  | 13.455   |
| ANNUAL | 3322                      | 5424                     | 0  | 14                | 5424                       | 3336                       | 8760             | 0                            | 0                         | 14                                   |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 8:42:27 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG.#7665 DENTAL CLINIC  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR                    | ELECTRICITY<br>69.967<br>220.173<br>28/ 8 | NATURAL-GAS<br>60.283<br>226.170<br>15/ 8 |
|-----|---|---|---|
| JAN | TOTAL (MBTU)<br>62.622<br>PEAK (KBTU)<br>219.726<br>DY/HR<br>3/ 8   | 72.410<br>206.722<br>18/16<br>6/ 7        | 40.496<br>156.484<br>6/ 7                 |
| FEB | TOTAL (MBTU)<br>68.446<br>PEAK (KBTU)<br>207.437<br>DY/HR<br>29/16  | 47.486<br>134.543<br>22/18                | 40.586<br>185.192<br>3/ 6                 |
| MAR | TOTAL (MBTU)<br>84.564<br>PEAK (KBTU)<br>324.850<br>DY/HR<br>16/15  | 27.949<br>145.624<br>13/18                | 40.496<br>156.484<br>6/ 7                 |
| APR | TOTAL (MBTU)<br>101.644<br>PEAK (KBTU)<br>316.665<br>DY/HR<br>28/16 | 27.949<br>145.624<br>13/18                | 40.496<br>156.484<br>6/ 7                 |
| MAY | TOTAL (MBTU)<br>104.317<br>PEAK (KBTU)<br>324.458<br>DY/HR<br>13/16 | 27.949<br>145.624<br>13/18                | 40.496<br>156.484<br>6/ 7                 |
| JUN | TOTAL (MBTU)<br>111.468<br>PEAK (KBTU)<br>333.558<br>DY/HR<br>11/16 | 27.949<br>145.624<br>13/18                | 40.496<br>156.484<br>6/ 7                 |
| JUL | TOTAL (MBTU)<br>92.989<br>PEAK (KBTU)<br>319.910<br>DY/HR<br>7/16   | 27.949<br>145.624<br>13/18                | 40.496<br>156.484<br>6/ 7                 |
| AUG | TOTAL (MBTU)<br>68.131<br>PEAK (KBTU)<br>207.437<br>DY/HR<br>19/16  | 27.949<br>145.624<br>13/18                | 40.496<br>156.484<br>6/ 7                 |
| SEP | TOTAL (MBTU)<br>66.352<br>PEAK (KBTU)<br>207.325<br>DY/HR<br>18/16  | 27.949<br>145.624<br>13/18                | 40.496<br>156.484<br>6/ 7                 |
| OCT | TOTAL (MBTU)<br>69.278<br>PEAK (KBTU)<br>219.797<br>DY/HR<br>13/ 8  | 27.949<br>145.624<br>13/18                | 40.496<br>156.484<br>6/ 7                 |
| NOV | TOTAL (MBTU)<br>972.187<br>PEAK (KBTU)<br>333.558                   | 27.949<br>145.624<br>13/18                | 40.496<br>156.484<br>6/ 7                 |
| DEC | TOTAL (MBTU)<br>972.187<br>PEAK (KBTU)<br>333.558                   | 27.949<br>145.624<br>13/18                | 40.496<br>156.484<br>6/ 7                 |



EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 8:42:27 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG.#7665 DENTAL CLINIC  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 14.90       | 345.82      |
| SPACE COOL      | 157.30      | 0.00        |
| HVAC AUX        | 402.41      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 310.84      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 86.71       | 0.00        |
| TOTAL           | 972.16      | 345.82      |

TOTAL SITE ENERGY 1318.00 MBTU 136.4 KBTU/SQFT-YR GROSS-AREA 136.7 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 3265.30 MBTU 338.0 KBTU/SQFT-YR GROSS-AREA 338.5 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.6  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*

LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #1 NIGHT SET BACK FOR BLDG.#7665 \*

LINE-5 \*DENTAL CLINIC \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_FULL =DAY-SCHEDULE (1,24) (1.) ..

SD\_WT\_HT =DAY-SCHEDULE (1,6) (55.)

(7,17) (74.)

(18,24) (55.) ..

SD\_SM\_CL =DAY-SCHEDULE (1,6) (85.)

(7,17) (72.)

(18,24) (85.) ..

SD\_OA% =DAY-SCHEDULE (1,24) (0.1) ..

SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

SD\_WT\_CL =DAY-SCHEDULE (1,6) (57.)

(7,17) (76.)

(18,24) (57.) ..

SD\_SM\_HT =DAY-SCHEDULE (1,6) (83.)

(7,17) (70.)

(18,24) (83.) ..

SD\_WT\_HT\_D =DAY-SCHEDULE (1,24) (55.) ..

SD\_SM\_CL\_D =DAY-SCHEDULE (1,24) (85.) ..

SD\_WT\_CL\_D =DAY-SCHEDULE (1,24) (57.) ..

SD\_SM\_HT\_D =DAY-SCHEDULE (1,24) (83.) ..

SD\_FAN\_CYC =DAY-SCHEDULE (1,6) (0.)

(7,17) (1.)

(18,24) (0.) ..

SW\_FULL\_ON =WEEK-SCHEDULE (ALL) SD\_FULL ..

SW\_WT\_HT =WEEK-SCHEDULE (WD) SD\_WT\_HT

(WEH) SD\_WT\_HT\_D ..

SW\_SM\_CL =WEEK-SCHEDULE (WD) SD\_SM\_CL

(WEH) SD\_SM\_CL\_D ..

SW\_OA% =WEEK-SCHEDULE (ALL) SD\_OA% ..

SW\_off =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_CL =WEEK-SCHEDULE (WD) SD\_WT\_CL

(WEH) SD\_WT\_CL\_D ..

SW\_SM\_HT =WEEK-SCHEDULE (WD) SD\_SM\_HT

(WEH) SD\_SM\_HT\_D ..

SW\_FAN\_CYC =WEEK-SCHEDULE (WD) SD\_FAN\_CYC

(WEH) SD\_OFF ..

S\_FULL\_ON =SCHEDULE THRU DEC 31 SW\_FULL\_ON ..

S\_FULL\_OFF =SCHEDULE THRU DEC 31 SW\_off ..

\$ HEATING SET TEMP

S\_HEAT\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

S\_OTSIDAIR =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HE\_SCHD =SCHEDULE THRU MAY 15 SW\_FULL\_ON  
THRU OCT 1 SW\_off  
THRU DEC 31 SW\_FULL\_ON ..

S\_CL\_SCHD =SCHEDULE THRU MAY 15 SW\_off  
THRU OCT 1 SW\_FULL\_ON  
THRU DEC 31 SW\_off ..

\$ COOLING SET TEMP

S\_COOL\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_HRLY-RPT =SCHEDULE THRU JAN 13 SW\_off  
THRU JAN 15 SW\_FULL\_ON  
THRU AUG 11 SW\_off  
THRU AUG 13 SW\_FULL\_ON  
THRU DEC 31 SW\_off ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

\$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

SPACE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

```

SPACE_4  =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
           HEAT-TEMP-SCH = S_HEAT_F  COOL-TEMP-SCH = S_COOL_F
           ZONE-TYPE = CONDITIONED
           THERMOSTAT-TYPE = PROPORTIONAL
           SIZING-OPTION = FROM-LOADS  ..

SPACE_5  =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
           HEAT-TEMP-SCH = S_HEAT_F  COOL-TEMP-SCH = S_COOL_F
           ZONE-TYPE = CONDITIONED
           THERMOSTAT-TYPE = PROPORTIONAL
           SIZING-OPTION = FROM-LOADS  ..

PLENUM_6 =ZONE  DESIGN-HEAT-T = 72.0  DESIGN-COOL-T = 74.0
           ZONE-TYPE = PLENUM  SIZING-OPTION = FROM-LOADS  ..

```

## \$ SYSTEM DESCRIPTION

```

MZ_W/DX  =SYSTEM  SYSTEM-TYPE = PMZS
           MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
           HEATING-SCHEDULE = S_HE_SCHD
           COOLING-SCHEDULE = S_CL_SCHD  MAX-HUMIDITY = 60.0
           MIN-HUMIDITY = 50.0  HEAT-CONTROL = COLDEST
           COOL-CONTROL = WARMEST  OA-CONTROL = FIXED
           SUPPLY-CFM = 19500.  RATED-CFM = 19500.
           MIN-OUTSIDE-AIR = 0.03  MAX-OA-FRACTION = 0.03
           FAN-SCHEDULE = S_FAN_CYC  SUPPLY-DELTA-T = 2.1
           SUPPLY-KW = 0.00069  NIGHT-CYCLE-CTRL = CYCLE-ON-ANY
           MIN-CFM-RATIO = 1.0  COOLING-CAPACITY = 664700.
           HEATING-CAPACITY = -450000.  CRANKCASE-HEAT = 3.73
           CRANKCASE-MAX-T = 0.  OUTSIDE-FAN-T = 45.
           HEAT-SOURCE = HOT-WATER  HUMIDIFIER-TYPE = HOT-WATER
           ZONE-NAMES = (SPACE_1, SPACE_2, SPACE_3, SPACE_4,
                        SPACE_5, PLENUM_6)  ..

```

## \$ HOURLY REPORT DESCRIPTION

```

AUH-BLK  =REPORT-BLOCK VARIABLE-TYPE = MZ_W/DX
           VARIABLE-LIST = (3,5,6,17)  ..

S_ZON-BLK =REPORT-BLOCK VARIABLE-TYPE = SPACE_4
           VARIABLE-LIST = (17,18,7,6)  ..

N_ZON-BLK =REPORT-BLOCK VARIABLE-TYPE = SPACE_3
           VARIABLE-LIST = (17,18,7,6)  ..

AHU-HRLY  = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
           REPORT-BLOCK = (AUH-BLK)

..

ZONES-HRLY = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
           REPORT-BLOCK = (S_ZON-BLK,N_ZON-BLK)

..

END  ..

COMPUTE SYSTEMS  ..

INPUT PLANT  ..

```

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 14:39:37 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|
| DENVER, CO 80227 RUN #1 NIGHT SET BACK FOR BLDG.#7665 DENTAL CLINIC                            |                             |                         |                      |                      |                             |                         |                      |                      |   |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ_W/DX TOPEKA, KS                               |                             |                         |                      |                      |                             |                         |                      |                      |   |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) |
| JAN  | 0.00000                     |                         |                      |                      | -17.291                     | 17                      | 7                    | 27.F                 | -281.390                                |
| FEB  | 0.00000                     |                         |                      |                      | -10.768                     | 7                       | 7                    | 26.F                 | -221.102                                |
| MAR  | 0.00000                     |                         |                      |                      | -14.490                     | 7                       | 7                    | 28.F                 | -87.943                                 |
| APR  | 0.00000                     |                         |                      |                      | -20.232                     | 22                      | 18                   | 67.F                 | -70.345                                 |
| MAY  | 38.86512                    | 16                      | 8                    | 61.F                 | -12.508                     | 13                      | 18                   | 80.F                 | -77.785                                 |
| JUN  | 79.12955                    | 27                      | 7                    | 72.F                 | 0.000                       |                         |                      |                      | 0.000                                   |
| JUL  | 83.60725                    | 18                      | 7                    | 76.F                 | 0.000                       |                         |                      |                      | 0.000                                   |
| AUG  | 89.43966                    | 22                      | 7                    | 76.F                 | 0.000                       |                         |                      |                      | 0.000                                   |
| SEP  | 65.87719                    | 6                       | 7                    | 75.F                 | 0.000                       |                         |                      |                      | 0.000                                   |
| OCT  | 0.00001                     | 1                       | 15                   | 82.F                 | -18.655                     | 6                       | 18                   | 67.F                 | -65.151                                 |
| NOV  | 0.00000                     |                         |                      |                      | -13.481                     | 14                      | 7                    | 32.F                 | -70.341                                 |
| DEC  | 0.00000                     |                         |                      |                      | -13.937                     | 12                      | 7                    | 2.F                  | -283.187                                |
| TOTAL  | 356.919                     |                         |                      |                      | -121.363                    |                         |                      |                      | -283.187                                |
| MAX  |                             |                         |                      |                      |                             |                         |                      |                      | 506.286                                 |
|  |                             |                         |                      |                      |                             |                         |                      |                      | 103.261                                 |

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 14:39:37 SDL RUN 1 |                          |                          |  |                   |                            |                            |                     |                     |                     |
|--|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|---------------------|---------------------|---------------------|
| DENVER, CO 80227 RUN #1 NIGHT SET BACK FOR BLDG.#7665 DENTAL CLINIC                            |                          |                          |  |                   |                            |                            |                     |                     |                     |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ_W/DX TOPEKA, KS                                  |                          |                          |  |                   |                            |                            |                     |                     |                     |
| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>ON |
| JAN  | 0                        | 687                      | 0  | 57                | 744                        | 0                          | 703                 | 472                 | 0                   |
| FEB  | 0                        | 641                      | 0  | 31                | 672                        | 0                          | 672                 | 463                 | 0                   |
| MAR  | 0                        | 740                      | 0  | 4                 | 744                        | 0                          | 744                 | 491                 | 0                   |
| APR  | 0                        | 720                      | 0  | 0                 | 720                        | 0                          | 720                 | 489                 | 0                   |
| MAY  | 210                      | 360                      | 0  | 174               | 360                        | 384                        | 692                 | 461                 | 0                   |
| JUN  | 466                      | 0                        | 0  | 254               | 0                          | 720                        | 641                 | 399                 | 0                   |
| JUL  | 514                      | 0                        | 0  | 230               | 0                          | 744                        | 608                 | 388                 | 0                   |
| AUG  | 524                      | 0                        | 0  | 220               | 0                          | 744                        | 625                 | 372                 | 0                   |
| SEP  | 361                      | 0                        | 0  | 359               | 0                          | 720                        | 678                 | 447                 | 0                   |
| OCT  | 6                        | 710                      | 0  | 28                | 720                        | 24                         | 744                 | 524                 | 0                   |
| NOV  | 0                        | 695                      | 0  | 25                | 720                        | 0                          | 720                 | 500                 | 0                   |
| DEC  | 0                        | 725                      | 0  | 19                | 744                        | 0                          | 741                 | 510                 | 0                   |
| ANNUAL   | 2081                     | 5278                     | 0  | 1401              | 5424                       | 3336                       | 8288                | 5516                | 0                   |
|  |                          |                          |  |                   |                            |                            |                     |                     | 929                 |

EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 14:39:37 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #1 NIGHT SET BACK FOR BLDG.#7665 DENTAL CLINIC  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>67.453<br>222.724<br>28/ 9 | NATURAL-GAS<br>31.983<br>378.401<br>17/ 7 |
|-----|--|---|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 67.453<br>222.724<br>28/ 9                | 31.983<br>378.401<br>17/ 7                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 61.984<br>222.704<br>3/ 8                 | 21.619<br>309.783<br>7/ 7                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 71.922<br>205.681<br>18/16                | 28.829<br>148.719<br>7/ 7                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 68.166<br>207.542<br>22/16                | 38.723<br>126.454<br>22/18                |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 78.315<br>352.576<br>16/ 8                | 23.514<br>135.895<br>13/18                |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 89.941<br>330.134<br>28/16                | 0.000<br>0.000<br>30/ 1                   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 87.424<br>337.587<br>22/16                | 0.000<br>0.000<br>31/ 1                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 95.993<br>347.908<br>22/14                | 0.000<br>0.000<br>31/ 1                   |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 85.465<br>335.889<br>6/16                 | 0.000<br>0.000<br>30/ 1                   |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 67.550<br>207.206<br>7/16                 | 35.932<br>118.203<br>6/18                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 65.988<br>206.068<br>18/16                | 26.861<br>126.450<br>14/ 7                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 68.468<br>222.724<br>13/ 8                | 27.087<br>380.405<br>12/ 7                |
|     | ONE YEAR<br>USE/PEAK                             | 908.669<br>352.576                        | 234.548<br>380.405                        |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 14:39:37 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SET BACK FOR BLDG #7665 DENTAL CLINIC  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 11.57       | 234.55      |
| SPACE COOL                                       | 118.79      | 0.00        |
| HVAC AUX   | 380.72      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 310.83      | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 86.71       | 0.00        |
| TOTAL  | 908.62      | 234.55      |

TOTAL SITE ENERGY 1143.22 MBTU 118.3 KBTU/SQFT-YR GROSS-AREA 118.5 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2963.28 MBTU 306.8 KBTU/SQFT-YR GROSS-AREA 307.2 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 14.4  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*

LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #2 DDC CONTROL FOR BLDG.#7665 \*

LINE-5 \*DENTAL CLINIC \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_FULL =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,24) (70.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,24) (76.) ..  
 SD\_OA% =DAY-SCHEDULE (1,24) (0.1) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,24) (70.2) ..  
 SD\_SM\_HT =DAY-SCHEDULE (1,24) (75.8) ..

SW\_FULL\_ON =WEEK-SCHEDULE (ALL) SD\_FULL ..

SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..

SW\_OA% =WEEK-SCHEDULE (ALL) SD\_OA% ..

SW\_off =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..

SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..

S\_FULL\_ON =SCHEDULE THRU DEC 31 SW\_FULL\_ON ..

S\_FULL\_OFF =SCHEDULE THRU DEC 31 SW\_off ..

## \$ HEATING SET TEMP

S\_HEAT\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

S\_OTSIDAIR =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HE\_SCHED =SCHEDULE THRU MAY 15 SW\_FULL\_ON  
 THRU OCT 1 SW\_off  
 THRU DEC 31 SW\_FULL\_ON ..

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_off  
 THRU OCT 1 SW\_FULL\_ON  
 THRU DEC 31 SW\_off ..

## \$ COOLING SET TEMP

S\_COOL\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_off  
THRU JAN 15 SW\_FULL\_ON  
THRU AUG 11 SW\_off  
THRU AUG 12 SW\_FULL\_ON  
THRU DEC 31 SW\_off ..

## \$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_4 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_5 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

PLENUM\_6 =ZONE DESIGN-HEAT-T = 72.0 DESIGN-COOL-T = 74.0  
ZONE-TYPE = PLENUM SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ\_W/DX =SYSTEM SYSTEM-TYPE = PMZS  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE\_SCHED  
COOLING-SCHEDULE = S\_CL\_SCHED MAX-HUMIDITY = 60.0  
MIN-HUMIDITY = 50.0 HEAT-CONTROL = COLDEST  
COOL-CONTROL = WARMEST OA-CONTROL = FIXED

```

SUPPLY-CFM = 19500.  RATED-CFM = 19500.
MIN-OUTSIDE-AIR = 0.03  MAX-OA-FRACTION = 0.03
FAN-SCHEDULE = S_FULL_ON  SUPPLY-DELTA-T = 2.1
SUPPLY-KW = 0.00069  NIGHT-CYCLE-CTRL = STAY-OFF
MIN-CFM-RATIO = 1.0  COOLING-CAPACITY = 664700.
HEATING-CAPACITY = -450000.  CRANKCASE-HEAT = 3.73
CRANKCASE-MAX-T = 0.  OUTSIDE-FAN-T = 45.
HEAT-SOURCE = HOT-WATER  HUMIDIFIER-TYPE = HOT-WATER
ZONE-NAMES = (SPACE_1, SPACE_2, SPACE_3, SPACE_4,
              SPACE_5, PLENUM_6) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

AUH-BLK  =REPORT-BLOCK VARIABLE-TYPE = MZ_W/DX
          VARIABLE-LIST = (3,5,6,17) ..
S_ZON-BLK =REPORT-BLOCK VARIABLE-TYPE = SPACE_4
          VARIABLE-LIST = (17,18,7,6) ..
N_ZON-BLK =REPORT-BLOCK VARIABLE-TYPE = SPACE_3
          VARIABLE-LIST = (17,18,7,6) ..
AHU-HRLY  = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (AUH-BLK)
..
ZONES-HRLY = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (S_ZON-BLK,N_ZON-BLK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #2 DDC CONTROL FOR BLDG.#7665      *
        LINE-5 *DENTAL CLINIC                        * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC WARNINGS ..
PLANT-REPORT VERIFICATION=(PV-A)
            SUMMARY=(PS-B,BEPS)
            HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_heaton  =DAY-SCHEDULE (1,24) (1.) ..
Pd_heatoff =DAY-SCHEDULE (1,24) (0.) ..

```

EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 14:10:35 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG.#7665 DENTAL CLINIC  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ\_W/DX TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |   |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | MAXIMUM<br>ELEC-<br>TRICAL<br>ENERGY<br>(KWH) |
| JAN   | 0.00000                     |                         |                      |                      | -20.952                     | 16                      | 3                    | 4.F                  | 2.F                                     | 19895.  |
| FEB   | 0.00000                     |                         |                      |                      | -11.929                     | 3                       | 6                    | -1.F                 | -2.F                                    | 17843.  |
| MAR   | 0.00000                     |                         |                      |                      | -14.538                     | 18                      | 18                   | 60.F                 | 43.F                                    | 20637.  |
| APR   | 0.00000                     |                         |                      |                      | -20.232                     | 22                      | 18                   | 67.F                 | 52.F                                    | 19390.  |
| MAY   | 44.64120                    | 16                      | 5                    | 59.F                 | -12.508                     | 13                      | 18                   | 80.F                 | 66.F                                    | 24071.  |
| JUN   | 89.20745                    | 28                      | 16                   | 90.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 28880.  |
| JUL   | 98.36989                    | 7                       | 16                   | 83.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 29418.  |
| AUG   | 102.36281                   | 11                      | 16                   | 100.F                | 0.000                       |                         |                      |                      | 0.000                                   | 31552.  |
| SEP   | 71.39226                    | 7                       | 16                   | 93.F                 | 0.000                       | 6                       | 18                   | 67.F                 | 52.F                                    | 26549.  |
| OCT   | 0.77718                     | 1                       | 18                   | 83.F                 | -18.518                     | 18                      | 18                   | 41.F                 | 34.F                                    | 19333.  |
| NOV   | 0.00000                     |                         |                      |                      | -13.437                     | 12                      | 6                    | 3.F                  | 2.F                                     | 18928.  |
| DEC   | 0.00000                     |                         |                      |                      | -15.454                     |                         |                      |                      |   | 19717.  |
| TOTAL | 406.751                     |                         |                      |                      | -127.568                    |                         |                      |                      |   | 276202.                                       |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      | -117.760                                | 95.653  |

EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 14:10:35 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG.#7665 DENTAL CLINIC  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ\_W/DX TOPEKA, KS

| MONTH | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  | HOURS |  |  |  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EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 14:10:35 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #2 DDC CONTROL FOR BLDG.#7665 DENTAL CLINIC  
 REPORT- PS-B TOPEKA, KS

| MO                   | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>69.121<br>217.733<br>28/ 8<br>61.914<br>216.818<br>3/ 8<br>71.761<br>205.533<br>18/16<br>67.795<br>206.313<br>29/16<br>83.053<br>326.053<br>16/ 8<br>98.608<br>309.228<br>28/16<br>100.447<br>316.330<br>13/16<br>107.732<br>326.600<br>11/16<br>90.649<br>312.156<br>7/16<br>67.488<br>206.313<br>19/16<br>65.810<br>205.916<br>18/16<br>68.443<br>217.160<br>13/ 8 | NATURAL-GAS<br>33.868<br>158.187<br>16/ 3<br>21.344<br>98.808<br>3/ 6<br>26.470<br>78.496<br>18/18<br>35.208<br>103.343<br>22/18<br>20.973<br>112.212<br>13/18<br>0.000<br>0.000<br>30/ 1<br>0.000<br>0.000<br>31/ 1<br>0.000<br>0.000<br>31/ 1<br>0.000<br>0.000<br>30/ 1<br>32.427<br>96.301<br>6/18<br>24.390<br>89.555<br>18/18<br>26.537<br>148.346<br>12/ 6 |
|----------------------|--|---|---|
| JAN                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 69.121<br>217.733<br>28/ 8  | 33.868<br>158.187<br>16/ 3  |
| FEB                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 61.914<br>216.818<br>3/ 8   | 21.344<br>98.808<br>3/ 6  |
| MAR                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 71.761<br>205.533<br>18/16  | 26.470<br>78.496<br>18/18   |
| APR                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 67.795<br>206.313<br>29/16  | 35.208<br>103.343<br>22/18  |
| MAY                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 83.053<br>326.053<br>16/ 8  | 20.973<br>112.212<br>13/18  |
| JUN                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 98.608<br>309.228<br>28/16  | 0.000<br>0.000<br>30/ 1   |
| JUL                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 100.447<br>316.330<br>13/16   | 0.000<br>0.000<br>31/ 1   |
| AUG                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 107.732<br>326.600<br>11/16   | 0.000<br>0.000<br>31/ 1   |
| SEP                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 90.649<br>312.156<br>7/16   | 0.000<br>0.000<br>30/ 1   |
| OCT                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 67.488<br>206.313<br>19/16  | 32.427<br>96.301<br>6/18  |
| NOV                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 65.810<br>205.916<br>18/16  | 24.390<br>89.555<br>18/18   |
| DEC                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 68.443<br>217.160<br>13/ 8  | 26.537<br>148.346<br>12/ 6  |
| ONE YEAR<br>USE/PEAK |  |   | 221.218<br>158.187  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOB-2.1D 5/ 9/1995 14:10:35 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG.#7665 DENTAL CLINIC  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 9.75        | 221.22      |
| SPACE COOL      | 143.08      | 0.00        |
| HVAC AUX        | 402.40      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 310.83      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 86.71       | 0.00        |
| TOTAL           | 952.77      | 221.22      |

TOTAL SITE ENERGY 1174.04 MBTU 121.5 KBTU/SQFT-YR GROSS-AREA 121.7 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 3082.54 MBTU 319.1 KBTU/SQFT-YR GROSS-AREA 319.6 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.9  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*

LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #3 ECONOMIZER FOR BLDG.#7665 \*

LINE-5 \*DENTAL CLINIC \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_FULL =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,6) (55.)  
 (7,17) (74.)  
 (18,24) (55.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,6) (85.)  
 (7,17) (72.)  
 (18,24) (85.) ..  
 SD\_OA% =DAY-SCHEDULE (1,24) (0.1) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,6) (57.)  
 (7,17) (76.)  
 (18,24) (57.) ..  
 SD\_SM\_HT =DAY-SCHEDULE (1,6) (83.)  
 (7,17) (70.)  
 (18,24) (83.) ..  
 SD\_WT\_HT\_D =DAY-SCHEDULE (1,24) (55.) ..  
 SD\_SM\_CL\_D =DAY-SCHEDULE (1,24) (85.) ..  
 SD\_WT\_CL\_D =DAY-SCHEDULE (1,24) (57.) ..  
 SD\_SM\_HT\_D =DAY-SCHEDULE (1,24) (83.) ..  
 SD\_FAN\_CYC =DAY-SCHEDULE (1,6) (0.)  
 (7,17) (1.)  
 (18,24) (0.) ..  
 SW\_FULL\_ON =WEEK-SCHEDULE (ALL) SD\_FULL ..  
 SW\_WT\_HT =WEEK-SCHEDULE (WD) SD\_WT\_HT  
 (WEH) SD\_WT\_HT\_D ..  
 SW\_SM\_CL =WEEK-SCHEDULE (WD) SD\_SM\_CL  
 (WEH) SD\_SM\_CL\_D ..  
 SW\_OA% =WEEK-SCHEDULE (ALL) SD\_OA% ..  
 SW\_off =WEEK-SCHEDULE (ALL) SD\_OFF ..  
 SW\_WT\_CL =WEEK-SCHEDULE (WD) SD\_WT\_CL  
 (WEH) SD\_WT\_CL\_D ..  
 SW\_SM\_HT =WEEK-SCHEDULE (WD) SD\_SM\_HT  
 (WEH) SD\_SM\_HT\_D ..  
 SW\_FAN\_CYC =WEEK-SCHEDULE (WD) SD\_FAN\_CYC  
 (WEH) SD\_OFF ..

S\_FULL\_ON =SCHEDULE THRU DEC 31 SW\_FULL\_ON ..

S\_FULL\_OFF =SCHEDULE THRU DEC 31 SW\_off ..

\$ HEATING SET TEMP

S\_HEAT\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

S\_OTSIDAIR =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HE\_SCHD =SCHEDULE THRU MAY 15 SW\_FULL\_ON  
THRU OCT 1 SW\_off  
THRU DEC 31 SW\_FULL\_ON ..

S\_CL\_SCHD =SCHEDULE THRU MAY 15 SW\_off  
THRU OCT 1 SW\_FULL\_ON  
THRU DEC 31 SW\_off ..

\$ COOLING SET TEMP

S\_COOL\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_HRLY-RPT =SCHEDULE THRU JAN 13 SW\_off  
THRU JAN 15 SW\_FULL\_ON  
THRU AUG 11 SW\_off  
THRU AUG 13 SW\_FULL\_ON  
THRU DEC 31 SW\_off ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

\$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

SPACE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..



SPACE\_4 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

SPACE\_5 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

PLENUM\_6 =ZONE DESIGN-HEAT-T = 72.0 DESIGN-COOL-T = 74.0  
 ZONE-TYPE = PLENUM SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ\_W/DX =SYSTEM SYSTEM-TYPE = PMZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE\_SCHD  
 COOLING-SCHEDULE = S\_CL\_SCHD MAX-HUMIDITY = 60.0  
 MIN-HUMIDITY = 50.0 ECONO-LIMIT-T = 69.0 ←  
 HEAT-CONTROL = COLDEST COOL-CONTROL = WARMEST  
 SUPPLY-CFM = 19500. RATED-CFM = 19500.  
 MIN-OUTSIDE-AIR = 0.03 FAN-SCHEDULE = S\_FAN\_CYC  
 SUPPLY-DELTA-T = 2.1 SUPPLY-KW = 0.00069  
 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY MIN-CFM-RATIO = 1.0  
 COOLING-CAPACITY = 664700.  
 HEATING-CAPACITY = -450000. CRANKCASE-HEAT = 3.73  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER HUMIDIFIER-TYPE = HOT-WATER  
 ZONE-NAMES = (SPACE\_1, SPACE\_2, SPACE\_3, SPACE\_4,  
 SPACE\_5, PLENUM\_6) ..

## \$ HOURLY REPORT DESCRIPTION

AUH-BLK =REPORT-BLOCK VARIABLE-TYPE = MZ\_W/DX  
 VARIABLE-LIST = (3,5,6,17) ..  
 S\_ZON-BLK =REPORT-BLOCK VARIABLE-TYPE = SPACE\_4  
 VARIABLE-LIST = (17,18,7,6) ..  
 N\_ZON-BLK =REPORT-BLOCK VARIABLE-TYPE = SPACE\_3  
 VARIABLE-LIST = (17,18,7,6) ..  
 AHU-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (AUH-BLK)  
 ..  
 ZONES-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (S\_ZON-BLK,N\_ZON-BLK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

| EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 15: 0: 8 SDL RUN 1 |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
|---|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG.#7665 DENTAL CLINIC                                 |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ_W/DX TOPEKA, KS                                |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
| MONTH   | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                                    |                                 |
|   | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -53.952                     | 31                      | 7                    | 24.F                 | 21.F                                    | 16978.                             | 63.387                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -44.277                     | 22                      | 7                    | 26.F                 | 24.F                                    | 15327.                             | 63.387                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -64.302                     | 18                      | 18                   | 60.F                 | 43.F                                    | 18390.                             | 59.657                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -50.168                     | 5                       | 18                   | 56.F                 | 41.F                                    | 18502.                             | 59.657                          |
| MAY   | 23.34469                    | 31                      | 7                    | 75.F                 | 69.F                                    | -9.827                      | 5                       | 7                    | 44.F                 | 40.F                                    | 21118.                             | 95.253                          |
| JUN   | 66.11934                    | 27                      | 7                    | 72.F                 | 71.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 25224.                             | 96.688                          |
| JUL   | 81.69007                    | 18                      | 7                    | 76.F                 | 72.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 25453.                             | 98.871                          |
| AUG   | 86.00661                    | 22                      | 7                    | 76.F                 | 72.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 27826.                             | 101.893                         |
| SEP   | 48.79244                    | 6                       | 7                    | 75.F                 | 71.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 23529.                             | 98.375                          |
| OCT   | 0.00001                     | 1                       | 13                   | 79.F                 | 66.F                                    | -19.246                     | 6                       | 18                   | 67.F                 | 52.F                                    | 18350.                             | 59.657                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -39.997                     | 28                      | 7                    | 28.F                 | 26.F                                    | 16762.                             | 59.657                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -49.815                     | 5                       | 7                    | 21.F                 | 18.F                                    | 16864.                             | 63.387                          |
| TOTAL   | 305.953                     |                         |                      |                      |   | -331.583                    |                         |                      |                      |   | 244317.                            |                                 |
| MAX   |                             |                         |                      |                      | 398.337                                 |                             |                         |                      |                      | -563.530                                |                                    | 101.893                         |

| EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 15: 0: 8 SDL RUN 1 |                          |                          |  |                            |                            |                              |                             |                                      |  |  |        |
|---|--------------------------|--------------------------|--|----------------------------|----------------------------|------------------------------|-----------------------------|--------------------------------------|--|--|--------|
| DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG.#7665 DENTAL CLINIC                                 |                          |                          |  |                            |                            |                              |                             |                                      |  |  |        |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ_W/DX TOPEKA, KS                                   |                          |                          |  |                            |                            |                              |                             |                                      |  |  |        |
| MONTH   | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | N U M B E R O F            |                            |                              |                             | H O U R S                            |  | COINCIDENT LOADS--                             |        |
|   |                          |                          |  | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>FANS ON<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |        |
| JAN   | 0                        | 526                      | 0  | 218                        | 744                        | 0                            | 528                         | 297                                  | 0  | 0.000  | 0.000  |
| FEB   | 0                        | 479                      | 0  | 193                        | 672                        | 0                            | 485                         | 276                                  | 0  | 0.000  | 0.000  |
| MAR   | 0                        | 553                      | 0  | 191                        | 744                        | 0                            | 577                         | 324                                  | 0  | -99.492  | 13.455 |
| APR   | 0                        | 492                      | 0  | 228                        | 720                        | 0                            | 654                         | 423                                  | 0  | 0.000  | 13.455 |
| MAY   | 140                      | 157                      | 0  | 447                        | 360                        | 384                          | 683                         | 452                                  | 0  | 0.000  | 69.072 |
| JUN   | 403                      | 0                        | 0  | 317                        | 0                          | 720                          | 641                         | 399                                  | 0  | 0.000  | 68.430 |
| JUL   | 491                      | 0                        | 0  | 253                        | 0                          | 744                          | 609                         | 389                                  | 0  | 0.000  | 72.207 |
| AUG   | 503                      | 0                        | 0  | 241                        | 0                          | 744                          | 625                         | 372                                  | 0  | 0.000  | 73.372 |
| SEP   | 265                      | 0                        | 0  | 455                        | 720                        | 24                           | 678                         | 447                                  | 0  | 0.000  | 70.101 |
| OCT   | 5                        | 284                      | 0  | 455                        | 720                        | 24                           | 677                         | 457                                  | 0  | 0.000  | 13.455 |
| NOV   | 0                        | 445                      | 0  | 275                        | 720                        | 0                            | 559                         | 339                                  | 0  | -98.255  | 13.455 |
| DEC   | 0                        | 532                      | 0  | 212                        | 744                        | 0                            | 532                         | 301                                  | 0  | -76.836  | 13.455 |
| ANNUAL  | 1807                     | 3468                     | 0  | 3485                       | 5424                       | 3336                         | 7248                        | 4476                                 | 0  |  |        |
|   |                          |                          |  |                            |                            |                              |                             |                                      | 1973   |  |        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 15: 0: 8 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG.#7665 DENTAL CLINIC  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR | ELECTRICITY<br>61.977<br>228.954<br>28/ 9 | NATURAL-GAS<br>93.149<br>735.959<br>31/ 7 |
|-----|--|---|---|
| JAN | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 55.585<br>224.389<br>3/ 8                 | 76.557<br>728.071<br>22/ 7                |
| FEB | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 67.077<br>216.218<br>31/ 9                | 107.755<br>726.340<br>18/18               |
| MAR | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 66.513<br>216.218<br>22/14                | 84.521<br>722.259<br>5/18                 |
| APR | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 72.818<br>325.235<br>31/16                | 17.326<br>562.401<br>5/ 7                 |
| MAY | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 86.127<br>330.134<br>28/16                | 0.000<br>0.000<br>30/ 1                   |
| JUN | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 86.907<br>337.587<br>22/16                | 0.000<br>0.000<br>31/ 1                   |
| JUL | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 95.009<br>347.908<br>22/14                | 0.000<br>0.000<br>31/ 1                   |
| AUG | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 80.339<br>335.894<br>6/16                 | 0.000<br>0.000<br>30/ 1                   |
| SEP | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 64.104<br>216.218<br>31/ 9                | 34.048<br>756.989<br>6/18                 |
| OCT | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 60.172<br>216.218<br>30/ 9                | 69.318<br>731.180<br>28/ 7                |
| NOV | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 61.302<br>227.787<br>13/ 8                | 86.408<br>738.002<br>5/ 7                 |
| DEC | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             |   |   |
|     | ONE YEAR<br>USE/PEAK                           | 857.931<br>347.908                        | 569.081<br>756.989                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 15: 0: 8 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG.#7665 DENTAL CLINIC  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 23.71       | 569.08      |
| SPACE COOL      | 103.70      | 0.00        |
| HVAC AUX        | 332.94      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 310.83      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 86.71       | 0.00        |
| TOTAL           | 857.89      | 569.08      |

TOTAL SITE ENERGY 1427.01 MBTU 147.7 KBTU/SQFT-YR GROSS-AREA 148.0 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 3145.45 MBTU 325.6 KBTU/SQFT-YR GROSS-AREA 326.1 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 20.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #4 NIGHT INFILTRATION FOR BLDG.#7665\*

LINE-5 \*DENTAL CLINIC \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
SYSTEMS-REPORT VERIFICATION=(SV-A)  
SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
HOURLY-DATA-SAVE = YES ..

\$ SCHEDULES

SD\_FULL =DAY-SCHEDULE (1,24) (1.) ..  
SD\_WT\_HT =DAY-SCHEDULE (1,24) (74.) ..  
SD\_SM\_CL =DAY-SCHEDULE (1,24) (72.) ..  
SD\_OA% =DAY-SCHEDULE (1,5) (0.)  
(6,17) (0.03)  
(18,24) (0.) ..



SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
SD\_WT\_CL =DAY-SCHEDULE (1,24) (74.2) ..  
SD\_SM\_HT =DAY-SCHEDULE (1,24) (71.8) ..

SW\_FULL\_ON =WEEK-SCHEDULE (ALL) SD\_FULL ..

SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..

SW\_OA% =WEEK-SCHEDULE (WD) SD\_OA%  
(WEH) SD\_OFF ..

SW\_off =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..

SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..

S\_FULL\_ON =SCHEDULE THRU DEC 31 SW\_FULL\_ON ..

S\_FULL\_OFF =SCHEDULE THRU DEC 31 SW\_off ..

\$ HEATING SET TEMP

S\_HEAT\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

S\_OTSIDAIR =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HE\_SCHED =SCHEDULE THRU MAY 15 SW\_FULL\_ON  
THRU OCT 1 SW\_off  
THRU DEC 31 SW\_FULL\_ON ..

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_off  
THRU OCT 1 SW\_FULL\_ON

THRU DEC 31 SW\_off ..

\$ COOLING SET TEMP

S\_COOL\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_off  
THRU JAN 15 SW\_FULL\_ON  
THRU AUG 11 SW\_off  
THRU AUG 12 SW\_FULL\_ON  
THRU DEC 31 SW\_off ..

\$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_4 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_5 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

PLENUM\_6 =ZONE DESIGN-HEAT-T = 72.0 DESIGN-COOL-T = 74.0  
ZONE-TYPE = PLENUM SIZING-OPTION = FROM-LOADS ..

\$ SYSTEM DESCRIPTION

MZ\_W/DX =SYSTEM SYSTEM-TYPE = PMZS  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE\_SCHED

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COOLING-SCHEDULE = S_CL_SCHED MAX-HUMIDITY = 60.0
MIN-HUMIDITY = 50.0 OA-CONTROL = FIXED
SUPPLY-CFM = 19500. RATED-CFM = 19500.
MIN-AIR-SCH = S_OTSIDAIR MAX-OA-FRACTION = 0.03
FAN-SCHEDULE = S_FULL_ON SUPPLY-DELTA-T = 2.1
SUPPLY-KW = 0.00069 NIGHT-CYCLE-CTRL = STAY-OFF
MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 664700.
HEATING-CAPACITY = -450000. CRANKCASE-HEAT = 3.73
CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.
HEAT-SOURCE = HOT-WATER HUMIDIFIER-TYPE = HOT-WATER
ZONE-NAMES = (SPACE_1, SPACE_2, SPACE_3, SPACE_4,
              SPACE_5, PLENUM_6) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

AUH-BLK  =REPORT-BLOCK VARIABLE-TYPE = MZ_W/DX
          VARIABLE-LIST = (3,5,6,17) ..
S_ZON-BLK =REPORT-BLOCK VARIABLE-TYPE = SPACE_4
          VARIABLE-LIST = (17,18,7,6) ..
N_ZON-BLK =REPORT-BLOCK VARIABLE-TYPE = SPACE_3
          VARIABLE-LIST = (17,18,7,6) ..
AHU-HRLY  = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (AUH-BLK)
..
ZONES-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (S_ZON-BLK,N_ZON-BLK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #4 NIGHT INFILTRATION FOR BLDG.#7665*
        LINE-5 *DENTAL CLINIC                                * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
PLANT-REPORT VERIFICATION=(PV-A)
            SUMMARY=(PS-B,BEPS)
            HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_heaton  =DAY-SCHEDULE (1,24) (1.) ..

```

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 15:13:59 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG.#7665DENTAL CLINIC  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ\_W/DX TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                                 |  |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|--|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |  |
| JAN   | 0.00000                     |                         |                      |                      | -15.229                     | 28 6                    | -2.F                 | -3.F                 | -151.545                                | 19885.                             | 63.387                          |  |
| FEB   | 0.00000                     |                         |                      |                      | -7.344                      | 3 6                     | -1.F                 | -2.F                 | -100.678                                | 17843.                             | 63.387                          |  |
| MAR   | 0.00000                     |                         |                      |                      | -9.198                      | 29 6                    | 27.F                 | 23.F                 | -58.060                                 | 20637.                             | 59.657                          |  |
| APR   | 0.00000                     |                         |                      |                      | -12.278                     | 22 17                   | 69.F                 | 54.F                 | -89.868                                 | 19390.                             | 59.657                          |  |
| MAY   | 48.73689                    | 16 3                    | 61.F                 | 59.F                 | -7.460                      | 13 17                   | 82.F                 | 65.F                 | -105.066                                | 24443.                             | 99.046                          |  |
| JUN   | 93.26552                    | 28 16                   | 90.F                 | 76.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 29238.                             | 92.743                          |  |
| JUL   | 100.51900                   | 13 16                   | 93.F                 | 77.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 29589.                             | 95.025                          |  |
| AUG   | 105.79280                   | 22 16                   | 96.F                 | 77.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 31873.                             | 97.690                          |  |
| SEP   | 77.55887                    | 7 16                    | 93.F                 | 76.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 27114.                             | 93.693                          |  |
| OCT   | 1.00734                     | 1 18                    | 83.F                 | 68.F                 | -11.061                     | 7 17                    | 73.F                 | 56.F                 | -77.097                                 | 19355.                             | 59.657                          |  |
| NOV   | 0.00000                     |                         |                      |                      | -8.256                      | 18 17                   | 44.F                 | 36.F                 | -67.556                                 | 18928.                             | 59.657                          |  |
| DEC   | 0.00000                     |                         |                      |                      | -10.523                     | 12 6                    | 3.F                  | 2.F                  | -144.877                                | 19717.                             | 63.387                          |  |
| TOTAL | 426.881                     |                         |                      |                      | -81.349                     |                         |                      |                      | -151.545                                | 278012.                            | 99.046                          |  |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 15:13:59 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG.#7665DENTAL CLINIC  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ\_W/DX TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |  |                   |                            |                            |                              |                           |                                      |  | --COINCIDENT LOADS--                           |  |
|--------|---------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |
| JAN    | 0                         | 744                      | 0  | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -3.594   | 13.455   |  |
| FEB    | 0                         | 672                      | 0  | 0                 | 672                        | 0                          | 672                          | 0                         | 0                                    | -3.927   | 13.455   |  |
| MAR    | 0                         | 744                      | 0  | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -4.619   | 13.455   |  |
| APR    | 0                         | 720                      | 0  | 0                 | 720                        | 0                          | 720                          | 0                         | 0                                    | -5.180   | 13.455   |  |
| MAY    | 384                       | 358                      | 0  | 2                 | 360                        | 384                        | 744                          | 0                         | 2                                    | 0.000  | 62.083   |  |
| JUN    | 720                       | 0                        | 0  | 0                 | 0                          | 720                        | 720                          | 0                         | 0                                    | 0.000  | 92.743   |  |
| JUL    | 744                       | 0                        | 0  | 0                 | 744                        | 744                        | 744                          | 0                         | 0                                    | 0.000  | 95.025   |  |
| AUG    | 744                       | 0                        | 0  | 0                 | 0                          | 744                        | 744                          | 0                         | 0                                    | 0.000  | 96.160   |  |
| SEP    | 719                       | 0                        | 0  | 1                 | 0                          | 720                        | 744                          | 0                         | 1                                    | 0.000  | 93.693   |  |
| OCT    | 24                        | 720                      | 0  | 0                 | 720                        | 24                         | 744                          | 0                         | 0                                    | 0.000  | 22.388   |  |
| NOV    | 0                         | 720                      | 0  | 0                 | 720                        | 0                          | 720                          | 0                         | 0                                    | -4.859   | 13.455   |  |
| DEC    | 0                         | 744                      | 0  | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -29.735  | 13.455   |  |
| ANNUAL | 3335                      | 5422                     | 0  | 3                 | 5424                       | 3336                       | 8760                         | 0                         | 3                                    |  |  |  |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 15:13:59 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG.#766SDENTAL CLINIC  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR                    | ELECTRICITY<br>69.077<br>219.799<br>28/ 8<br>61.628<br>218.764<br>3/ 8<br>71.337<br>207.063<br>25/16<br>67.193<br>207.063<br>29/16<br>83.955<br>338.187<br>16/ 8<br>99.831<br>316.664<br>28/16<br>101.031<br>324.454<br>13/16<br>108.828<br>333.554<br>11/16<br>92.579<br>319.907<br>7/16<br>66.991<br>207.063<br>28/16<br>65.406<br>207.063<br>25/16<br>68.224<br>219.760<br>13/ 8 | NATURAL-GAS<br>27.005<br>203.570<br>28/ 6<br>14.370<br>145.089<br>3/ 6<br>17.765<br>93.345<br>29/ 6<br>22.210<br>132.202<br>22/17<br>12.763<br>150.275<br>13/17<br>0.000<br>0.000<br>30/ 1<br>0.000<br>0.000<br>31/ 1<br>0.000<br>0.000<br>31/ 1<br>0.000<br>0.000<br>30/ 1<br>20.228<br>116.769<br>7/17<br>16.006<br>105.092<br>18/17<br>19.569<br>196.108<br>12/ 6 |
|-----|---|---|--|
| JAN | TOTAL (MBTU)<br>69.077<br>PEAK (KBTU)<br>219.799<br>DY/HR<br>28/ 8  | 69.077<br>219.799<br>28/ 8  | 27.005<br>203.570<br>28/ 6   |
| FEB | TOTAL (MBTU)<br>61.628<br>PEAK (KBTU)<br>218.764<br>DY/HR<br>3/ 8   | 61.628<br>218.764<br>3/ 8   | 14.370<br>145.089<br>3/ 6  |
| MAR | TOTAL (MBTU)<br>71.337<br>PEAK (KBTU)<br>207.063<br>DY/HR<br>25/16  | 71.337<br>207.063<br>25/16  | 17.765<br>93.345<br>29/ 6  |
| APR | TOTAL (MBTU)<br>67.193<br>PEAK (KBTU)<br>207.063<br>DY/HR<br>29/16  | 67.193<br>207.063<br>29/16  | 22.210<br>132.202<br>22/17   |
| MAY | TOTAL (MBTU)<br>83.955<br>PEAK (KBTU)<br>338.187<br>DY/HR<br>16/ 8  | 83.955<br>338.187<br>16/ 8  | 12.763<br>150.275<br>13/17   |
| JUN | TOTAL (MBTU)<br>99.831<br>PEAK (KBTU)<br>316.664<br>DY/HR<br>28/16  | 99.831<br>316.664<br>28/16  | 0.000<br>0.000<br>30/ 1  |
| JUL | TOTAL (MBTU)<br>101.031<br>PEAK (KBTU)<br>324.454<br>DY/HR<br>13/16 | 101.031<br>324.454<br>13/16   | 0.000<br>0.000<br>31/ 1  |
| AUG | TOTAL (MBTU)<br>108.828<br>PEAK (KBTU)<br>333.554<br>DY/HR<br>11/16 | 108.828<br>333.554<br>11/16   | 0.000<br>0.000<br>31/ 1  |
| SEP | TOTAL (MBTU)<br>92.579<br>PEAK (KBTU)<br>319.907<br>DY/HR<br>7/16   | 92.579<br>319.907<br>7/16   | 0.000<br>0.000<br>30/ 1  |
| OCT | TOTAL (MBTU)<br>66.991<br>PEAK (KBTU)<br>207.063<br>DY/HR<br>28/16  | 66.991<br>207.063<br>28/16  | 20.228<br>116.769<br>7/17  |
| NOV | TOTAL (MBTU)<br>65.406<br>PEAK (KBTU)<br>207.063<br>DY/HR<br>25/16  | 65.406<br>207.063<br>25/16  | 16.006<br>105.092<br>18/17   |
| DEC | TOTAL (MBTU)<br>68.224<br>PEAK (KBTU)<br>219.760<br>DY/HR<br>13/ 8  | 68.224<br>219.760<br>13/ 8  | 19.569<br>196.108<br>12/ 6   |
|     | ONE YEAR<br>USE/PEAK  | 956.081<br>338.187  | 149.916<br>203.570   |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 15:13:59 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG.#7665DENTAL CLINIC  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 6.83        | 149.92      |
| SPACE COOL      | 149.26      | 0.00        |
| HVAC AUX        | 402.41      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 310.83      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 86.71       | 0.00        |
| TOTAL           | 956.04      | 149.92      |

TOTAL SITE ENERGY 1106.00 MBTU 114.5 KBTU/SQFT-YR GROSS-AREA 114.7 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 3021.03 MBTU 312.7 KBTU/SQFT-YR GROSS-AREA 313.2 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.3  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*

LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #5 DAY INFILTRATION FOR BLDG.#7665 \*

LINE-5 \*DENTAL CLINIC \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_FULL =DAY-SCHEDULE (1,24) (1.) ..

SD\_WT\_HT =DAY-SCHEDULE (1,24) (74.) ..

SD\_SM\_CL =DAY-SCHEDULE (1,24) (72.) ..

SD\_OA% =DAY-SCHEDULE (1,5) (0.03)

(6,17) (0.)

(18,24) (0.03) ..

SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

SD\_WT\_CL =DAY-SCHEDULE (1,24) (74.2) ..

SD\_SM\_HT =DAY-SCHEDULE (1,24) (71.8) ..

SD\_OA%\_D =DAY-SCHEDULE (1,24) (0.03) ..

SW\_FULL\_ON =WEEK-SCHEDULE (ALL) SD\_FULL ..

SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..

SW\_OA% =WEEK-SCHEDULE (WD) SD\_OA%  
 (WEH) SD\_OA%\_D ..

SW\_off =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..

SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..

S\_FULL\_ON =SCHEDULE THRU DEC 31 SW\_FULL\_ON ..

S\_FULL\_OFF =SCHEDULE THRU DEC 31 SW\_off ..

## \$ HEATING SET TEMP

S\_HEAT\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

S\_OTSIDAIR =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HE\_SCHED =SCHEDULE THRU MAY 15 SW\_FULL\_ON  
 THRU OCT 1 SW\_off  
 THRU DEC 31 SW\_FULL\_ON ..

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_off

THRU OCT 1 SW\_FULL\_ON  
THRU DEC 31 SW\_off ..

## \$ COOLING SET TEMP

S\_COOL\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_off  
THRU JAN 15 SW\_FULL\_ON  
THRU AUG 11 SW\_off  
THRU AUG 12 SW\_FULL\_ON  
THRU DEC 31 SW\_off ..

## \$ ZONE DESCRIPTION

SPACE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_3 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_4 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

SPACE\_5 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HEAT\_F COOL-TEMP-SCH = S\_COOL\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

PLENUM\_6 =ZONE DESIGN-HEAT-T = 72.0 DESIGN-COOL-T = 74.0  
ZONE-TYPE = PLENUM SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ\_W/DX =SYSTEM SYSTEM-TYPE = PMZS  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0

```

HEATING-SCHEDULE = S_HE_SCHD
COOLING-SCHEDULE = S_CL_SCHD MAX-HUMIDITY = 60.0
MIN-HUMIDITY = 50.0 OA-CONTROL = FIXED
SUPPLY-CFM = 19500. RATED-CFM = 19500.
MIN-AIR-SCH = S_OTSIDAIR MAX-OA-FRACTION = 0.03
FAN-SCHEDULE = S_FULL_ON SUPPLY-DELTA-T = 2.1
SUPPLY-KW = 0.00069 NIGHT-CYCLE-CTRL = STAY-OFF
MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 664700.
HEATING-CAPACITY = -450000. CRANKCASE-HEAT = 3.73
CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.
HEAT-SOURCE = HOT-WATER HUMIDIFIER-TYPE = HOT-WATER
ZONE-NAMES = (SPACE_1, SPACE_2, SPACE_3, SPACE_4,
              SPACE_5, PLENUM_6) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

AUH-BLK  =REPORT-BLOCK VARIABLE-TYPE = MZ_W/DX
          VARIABLE-LIST = (3,5,6,17) ..
S_ZON-BLK =REPORT-BLOCK VARIABLE-TYPE = SPACE_4
          VARIABLE-LIST = (17,18,7,6) ..
N_ZON-BLK =REPORT-BLOCK VARIABLE-TYPE = SPACE_3
          VARIABLE-LIST = (17,18,7,6) ..
AHU-HRLY  = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (AUH-BLK)
..
ZONES-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (S_ZON-BLK,N_ZON-BLK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE LINE-1 *      EMC      ENGINEERS      INC.      *
      LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
      LINE-3 *      DENVER,      CO      80227      *

      LINE-4 *RUN #5 DAY INFILTRATION FOR BLDG.#7665 *
      LINE-5 *DENTAL CLINIC                        * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
PLANT-REPORT VERIFICATION=(PV-A)
            SUMMARY=(PS-B,BEPS)
            HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 15:29:48 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG.#7665 DENTAL CLINIC                          |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ_W/DX TOPEKA, KS                               |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----                                    |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN  | 0.00000                     |                         |                      |                      | -30.868                     | 16 3                    | 4. F                 | 2. F                 | -154.344                                | 19885.                             | 63.387                          |
| FEB  | 0.00000                     |                         |                      |                      | -19.151                     | 28 5                    | 14. F                | 13. F                | -111.937                                | 17843.                             | 63.387                          |
| MAR  | 0.00000                     |                         |                      |                      | -18.459                     | 6 7                     | 19. F                | 18. F                | -100.505                                | 20637.                             | 59.657                          |
| APR  | 0.00000                     |                         |                      |                      | -22.664                     | 22 18                   | 67. F                | 52. F                | -114.138                                | 19390.                             | 59.657                          |
| MAY  | 47.87705                    | 16 5                    | 59. F                | 58. F                | -13.674                     | 13 18                   | 80. F                | 66. F                | -122.542                                | 24385.                             | 96.902                          |
| JUN  | 94.97421                    | 29 16                   | 89. F                | 75. F                | 0.000                       |                         |                      |                      | 0.000                                   | 29460.                             | 89.425                          |
| JUL  | 105.07058                   | 7 16                    | 83. F                | 73. F                | 0.000                       |                         |                      |                      | 0.000                                   | 30124.                             | 91.273                          |
| AUG  | 108.14583                   | 11 16                   | 100. F               | 71. F                | 0.000                       |                         |                      |                      | 0.000                                   | 32172.                             | 95.221                          |
| SEP  | 76.59960                    | 7 16                    | 93. F                | 76. F                | 0.000                       |                         |                      |                      | 0.000                                   | 27062.                             | 90.273                          |
| OCT  | 0.96750                     | 1 18                    | 83. F                | 68. F                | -20.627                     | 7 18                    | 71. F                | 55. F                | -101.116                                | 19352.                             | 59.657                          |
| NOV  | 0.00000                     |                         |                      |                      | -16.911                     | 18 18                   | 41. F                | 34. F                | -95.491                                 | 18928.                             | 59.657                          |
| DEC  | 0.00000                     |                         |                      |                      | -23.781                     | 12 5                    | 4. F                 | 3. F                 | -142.251                                | 19717.                             | 63.387                          |
| TOTAL  | 433.635                     |                         |                      |                      | -166.133                    |                         |                      |                      | -154.344                                | 278956.                            | 96.902                          |
| MAX  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 15:29:48 SDL RUN 1 |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
|--|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG.#7665 DENTAL CLINIC                          |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ_W/DX TOPEKA, KS                                  |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----  |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN  | 0                        | 744                      | 0  | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -30.755  | 13.455   |
| FEB  | 0                        | 672                      | 0  | 0                 | 672                        | 0                          | 672                          | 0                         | 0                                    | -27.730  | 13.455   |
| MAR  | 0                        | 744                      | 0  | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -39.428  | 13.455   |
| APR  | 0                        | 697                      | 0  | 23                | 720                        | 0                          | 720                          | 0                         | 23                                   | -54.948  | 13.455   |
| MAY  | 384                      | 333                      | 0  | 27                | 360                        | 384                        | 744                          | 0                         | 27                                   | 0.000  | 53.867   |
| JUN  | 720                      | 0                        | 0  | 0                 | 0                          | 720                        | 720                          | 0                         | 0                                    | 0.000  | 89.191   |
| JUL  | 744                      | 0                        | 0  | 0                 | 0                          | 744                        | 744                          | 0                         | 0                                    | 0.000  | 88.607   |
| AUG  | 744                      | 0                        | 0  | 0                 | 0                          | 744                        | 744                          | 0                         | 0                                    | 0.000  | 95.221   |
| SEP  | 710                      | 0                        | 0  | 10                | 720                        | 720                        | 720                          | 0                         | 10                                   | 0.000  | 90.273   |
| OCT  | 21                       | 710                      | 0  | 13                | 720                        | 24                         | 744                          | 0                         | 13                                   | 0.000  | 23.730   |
| NOV  | 0                        | 720                      | 0  | 0                 | 720                        | 0                          | 720                          | 0                         | 0                                    | -37.985  | 13.455   |
| DEC  | 0                        | 744                      | 0  | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -84.271  | 13.455   |
| ANNUAL   | 3323                     | 5364                     | 0  | 73                | 5424                       | 3336                       | 8760                         | 0                         | 73                                   |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 15:29:48 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG.#7665 DENTAL CLINIC  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR | ELECTRICITY<br>69.544<br>217.112<br>28/ 8 | NATURAL-GAS<br>48.920<br>207.330<br>16/ 3 |
|-----|--|---|---|
| JAN | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 69.544<br>217.112<br>28/ 8                | 48.920<br>207.330<br>16/ 3                |
| FEB | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 62.302<br>216.684<br>3/ 8                 | 32.892<br>158.846<br>28/ 5                |
| MAR | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 71.976<br>203.834<br>30/16                | 32.920<br>145.358<br>6/ 7                 |
| APR | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 67.792<br>203.834<br>11/11                | 38.514<br>161.423<br>22/18                |
| MAY | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 84.091<br>330.865<br>16/ 8                | 22.344<br>171.199<br>13/18                |
| JUN | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 100.590<br>305.336<br>28/16               | 0.000<br>0.000<br>30/ 1                   |
| JUL | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 102.857<br>311.644<br>13/16               | 0.000<br>0.000<br>31/ 1                   |
| AUG | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 109.851<br>325.124<br>11/16               | 0.000<br>0.000<br>31/ 1                   |
| SEP | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 92.402<br>308.232<br>7/16                 | 0.000<br>0.000<br>30/ 1                   |
| OCT | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 67.584<br>203.834<br>31/14                | 35.547<br>146.084<br>7/18                 |
| NOV | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 66.015<br>203.834<br>30/16                | 30.245<br>139.387<br>18/18                |
| DEC | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 68.897<br>216.913<br>13/ 8                | 39.838<br>193.753<br>12/ 5                |
|     | ONE YEAR<br>USE/PEAK                           | 963.901<br>330.865                        | 281.220<br>207.330                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 9/1995 15:29:48 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG #7665 DENTAL CLINIC  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

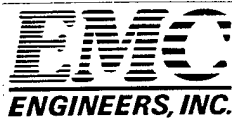
| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 11.43       | 281.22      |
| SPACE COOL      | 152.49      | 0.00        |
| HVAC AUX        | 402.41      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 310.84      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 86.71       | 0.00        |
| TOTAL           | 963.87      | 281.22      |

TOTAL SITE ENERGY 1245.12 MBTU 128.9 KBTU/SQFT-YR GROSS-AREA 129.1 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 3175.82 MBTU 328.8 KBTU/SQFT-YR GROSS-AREA 329.3 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.6  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



**COMPUTER ENERGY SIMULATIONS**

**BLDG. 7245A/B  
DINING (KITCHEN) BUILDINGS**



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

BUILDING NO.: 7245  
BLDG. TYPE: ENL PERS DINING FACILITY - DINING AREA

### ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3    | RUN4    | RUN5    |
|----------------|---------|---------|---------|---------|---------|---------|
| HEATING (MBtu) | 1112.1  | 655.3   | 932.1   | 673.6   | 697.6   | 419.7   |
| COOLING (kWH)  | 205,819 | 191,685 | 192,197 | 185,719 | 196,727 | 192,561 |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 14,820 CFM                        |
| FLOOR AREA     | 7,353 FT <sup>2</sup>             |
| CFMI           | 4001 CFM                          |
| UA             | 7988 BTU/HR-°F                    |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

| EZDOE COMPUTER RUN DEFINITION: |                             |
|--------------------------------|-----------------------------|
| BASERUN                        | EXISTING OPERATION          |
| RUN1                           | NIGHT SETBACK               |
| RUN2                           | DDC CONTROL                 |
| RUN3                           | ECONOMIZER                  |
| RUN4                           | NIGHTTIME INFILTRATION (OA) |
| RUN5                           | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      |            | ANNUAL HEATING & COOLING HOURS |            |
|--------------------|-------------------|------|------------|--------------------------------|------------|
| M-F                | 600               | 2000 | 70 HR      | HR. ON HEATING                 | 3178 HR/YR |
| SAT.               | 600               | 2000 | 14 HR      | HR. ON COOLING                 | 1932 HR/YR |
| SUN.               | 600               | 2000 | 14 HR      | HR. OFF HEATING                | 2270 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 98 HR/WK   | HR. OFF COOLING                | 1380 HR/YR |
|                    | TOTAL UNOCC. HR.  |      | 70 HR/WK   |                                |            |
|                    | ANNUAL OCCUPY HR. |      | 5110 HR/YR |                                |            |
|                    | ANNUAL UNOCC. HR. |      | 3650 HR/YR |                                |            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING

8760 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY

5448 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

3312 HR/YR

HRS SAVED (HTG ONLY)

5448

-

3178

=

2270 HR/YR

HRS SAVED (CLG ONLY)

3312

-

1932

=

1380 HR/YR

|           |   |   |               |   |                     |
|-----------|---|---|---------------|---|---------------------|
| HOAUHC    | 1112.07 MBtu  | - | 697.57 MBtu   | = | 2.84E+01 Btu/CFM-HR |
|           | 4001.4 CFM  | x | 3650 HR/YR    |   |                     |
| HOAUH     | 1112.07 MBtu  | - | 697.57 MBtu   | = | 4.56E+01 Btu/CFM-HR |
|           | 4001.4 CFM  | x | 2270 HR/YR    |   |                     |
| COAUHC    | 205,818.9 kWH   | - | 196,727.2 kWH | = | 6.23E-04 kWH/CFM-HR |
|           | 4001.4 CFM  | x | 3650 HR/YR    |   |                     |
| COAUC     | 205,818.9 kWH   | - | 196,727.2 kWH | = | 1.65E-03 kWH/CFM-HR |
|           | 4001.4 CFM  | x | 1380 HR/YR    |   |                     |
| HOAOHC    | 1112.07 MBtu  | - | 419.68 MBtu   | = | 3.39E+01 Btu/CFM-HR |
|           | 4001.4 CFM  | x | 5110 HR/YR    |   |                     |
| HOAOH     | 1112.07 MBtu  | - | 419.68 MBtu   | = | 5.44E+01 Btu/CFM-HR |
|           | 4001.4 CFM  | x | 3178 HR/YR    |   |                     |
| COAOHC    | 205,818.9 kWH   | - | 192,560.8 kWH | = | 6.48E-04 kWH/CFM-HR |
|           | 4001.4 CFM  | x | 5110 HR/YR    |   |                     |
| COAOC     | 205,818.9 kWH   | - | 192,560.8 kWH | = | 1.71E-03 kWH/CFM-HR |
|           | 4001.4 CFM  | x | 1932 HR/YR    |   |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | = | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | = | 0.17                |
| ECC       | 191,684.7 kWH   | - | 185,719.3 kWH | = | 2.08E-04 kWH/CFM-HR |
|           | 14820 CFM   | x | 1932 HR/YR    |   |                     |
| ECHC      | 191,684.7 kWH   | - | 185,719.3 kWH | = | 7.88E-05 kWH/CFM-HR |
|           | 14820 CFM   | x | 5110 HR/YR    |   |                     |
| NSUCHC    | 205,818.9 kWH   | - | 191,684.7 kWH | = | 2.61E-04 kWH/CFM-HR |
|           | 14820 CFM   | x | 3650 HR/YR    |   |                     |
| NSUCC     | 205,818.9 kWH   | - | 191,684.7 kWH | = | 6.91E-04 kWH/CFM-HR |
|           | 14820 CFM   | x | 1380 HR/YR    |   |                     |
| DDCCHC    | 205,818.9 kWH   | - | 192,197.5 kWH | = | 1.80E-04 kWH/CFM-HR |
|           | 14820 CFM   | x | 5110 HR/YR    |   |                     |
| DDCCC     | 205,818.9 kWH   | - | 192,197.5 kWH | = | 4.76E-04 kWH/CFM-HR |
|           | 14820 CFM   | x | 1932 HR/YR    |   |                     |
| NSC       | 1112.07 MBtu  | - | 655.33 MBtu   | = | 5.72E+04 Btu/UA     |
|           | 7987.75158 UA   |   |               |   |                     |
| DDCH      | 1112.07 MBtu  | - | 932.11 MBtu   | = | 2.25E+04 Btu/UA     |
|           | 7987.75158 UA   |   |               |   |                     |
| OPT       | (2 HR/DAY X 240 DAY/YR)                               | - | 175 HR/YR     | = | 305 HR/YR           |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               | = | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01          | = | 5.67 HR/YR          |



INPUT LOADS ..

```

$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
      LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
      LINE-3 *      DENVER,      CO      80227      *

      LINE-4 *BASELINE SIMULATION FOR BLDG. 7245      *
      LINE-5 *DINING AREA                                * ..

```

```

ABORT          ERRORS ..
DIAGNOSTIC     WARNINGS ..
LOADS-REPORT   VERIFICATION=(LV-D)
               SUMMARY=(LS-C,LS-D)
               HOURLY-DATA-SAVE = YES ..
BUILDING-LOCATION  LATITUDE = 39.0
                LONGITUDE = 96.5
                ALTITUDE = 1065.
                TIME-ZONE = 6
                GROSS-AREA = 7353.4
                SHIELDING-COEF = 0.29
                X-REF = 0.0
                Y-REF = 0.0 ..
RUN-PERIOD      JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

```

LD_ON          =DAY-SCHEDULE (1,24) (1.) ..
LD_OFF         =DAY-SCHEDULE (1,24) (0.) ..
LD_7-4         =DAY-SCHEDULE (1,6) (0.)
                (7,16) (1.)
                (17,24) (0.) ..
LD_7:3-5:3     =DAY-SCHEDULE (1,6) (0.)
                (7) (0.5)
                (8,16) (1.)
                (17) (0.5)
                (18,24) (0.) ..
LD_DIN_PEO     =DAY-SCHEDULE (1,4) (0.)
                (5) (0.5)
                (6,7) (1.)
                (8) (0.5)
                (9,10) (0.)
                (11,13) (0.5,1.,0.5)
                (14,16) (0.)

```

(17) (0.5)  
 (18,19) (1.)  
 (20) (0.5)  
 (21,24) (0.) ..

LD\_DIN\_LIG =DAY-SCHEDULE (1,4) (0.)  
 (5) (0.5)  
 (6,20) (1.)  
 (21,24) (0.) ..

LW\_ON =WEEK-SCHEDULE (ALL) LD\_ON ..

LW\_OFF =WEEK-SCHEDULE (ALL) LD\_OFF ..

LW\_7-4M-F =WEEK-SCHEDULE (WD) LD\_7-4  
 (WEH) LD\_OFF ..

LW\_7343M-F =WEEK-SCHEDULE (WD) LD\_7:3-5:3  
 (WEH) LD\_OFF ..

LW\_DIN\_PEO =WEEK-SCHEDULE (ALL) LD\_DIN\_PEO ..

LW\_DIN\_LIG =WEEK-SCHEDULE (ALL) LD\_DIN\_LIG ..

L\_FULL\_ON =SCHEDULE THRU DEC 31 LW\_ON ..

L\_FULL\_OFF =SCHEDULE THRU DEC 31 LW\_OFF ..

\$ OPERATIONS=7-4 M-F

L\_7-4M-F =SCHEDULE THRU DEC 31 LW\_7-4M-F ..

\$ INFILT IN WINTER ONLY

L\_WINTINFL =SCHEDULE THRU MAY 15 LW\_ON  
 THRU OCT 1 LW\_OFF  
 THRU DEC 31 LW\_ON ..

\$ M-F\_7:30-4:30

L\_M-F7343 =SCHEDULE THRU DEC 31 LW\_7343M-F ..

\$ DINING AREA PEOPLE LOAD

L\_DINING\_P =SCHEDULE THRU DEC 31 LW\_DIN\_PEO ..

\$ DINING AREA LIGHT LOAD

L\_DININ\_LI =SCHEDULE THRU DEC 31 LW\_DIN\_LIG ..

#### \$ CONSTRUCTION TYPES

\$ BUILT-UP ROOF ON METAL DECKING

ROOF-1 =CONSTRUCTION LAYERS = ASHR-17

ABSORPTANCE = 0.800

ROUGHNESS = 1 ..

## \$ BUILT-UP ROOF W/INS W/NO DROP CEI

ASHR-17A =LAYERS MATERIAL=(HF-E2,HF-E3,HF-B6,HF-A3)  
 THICKNESS=(0.042,0.031,0.167,0.005) ..

ROOF-2 =CONSTRUCTION LAYERS = ASHR-17A  
 ABSORPTANCE = 0.800  
 ROUGHNESS = 1 ..

## \$ BUILT-UP ROOF W/NO DROP CEILING

ASHR-17B =LAYERS MATERIAL=(HF-E2,HF-E3,HF-A3)  
 THICKNESS=(0.042,0.031,0.005) ..

ROOF-3 =CONSTRUCTION LAYERS = ASHR-17B  
 ABSORPTANCE = 0.800  
 ROUGHNESS = 1 ..

## \$ FACIA BORD W/ INS &amp; GYP

WALL-1 =LAYERS MATERIAL=(CM03,AL11,PW05,IN23,GP02) I-F-R= 0.6100  
 THICKNESS=(0.083,0.000,0.063,0.167,0.052) ..

EXWALL-1 =CONSTRUCTION LAYERS = WALL-1  
 ROUGHNESS = 2 ..

## \$ EXTERIOR WALL BRICK, INSL, BRICK

WALL-2 =LAYERS MATERIAL=(BK01,AL11,IN35,CB06,GP01) I-F-R= 0.6100  
 THICKNESS=(0.333,0.000,0.167,0.500,0.042) ..

EXWALL-2 =CONSTRUCTION LAYERS = WALL-2  
 ABSORPTANCE = 0.880  
 ROUGHNESS = 2 ..

## \$ STD INTER WALL CONST

IW-LAYER =LAYERS MATERIAL=(GP01,WD01,AL21,GP01)  
 THICKNESS=(0.042,0.063,0.000,0.042) ..

INWALL =CONSTRUCTION LAYERS = IW-LAYER  
 ROUGHNESS = 5 ..

## \$ HEAVY CONCRETE WALL

VAULT =CONSTRUCTION LAYERS = ASHI-21 ..  
 DOORCON =CONSTRUCTION U-VALUE = 0.400 ..

## \$ SLAB FLOOR

FLOOR =CONSTRUCTION U-VALUE = 0.020  
 ABSORPTANCE = 0.610  
 ROUGHNESS = 5 ..

## \$ DROP CEIL W/ INSL @ R-19

INSL-CEL =LAYERS MATERIAL=(AC02,IN03) I-F-R= 0.8000  
 THICKNESS=(0.042,0.511) ..

DROPCEIL =CONSTRUCTION LAYERS = INSL-CEL  
 ROUGHNESS = 2 ..

1\_PN\_STD =GLASS-TYPE GLASS-TYPE-CODE = 1  
 PANES = 1 ..

2\_PN\_STD =GLASS-TYPE GLASS-TYPE-CODE = 1  
 PANES = 2 ..

## \$ SPACE DESCRIPTION

```

diningarea =SPACE  AREA = 7353.4  VOLUME = 78436.0
                    TEMPERATURE = (73.)  ZONE-TYPE = CONDITIONED
                    PEOPLE-SCHEDULE = L_DINING_P  AREA/PERSON = 39.0
                    PEOPLE-HG-LAT = 625.0  PEOPLE-HG-SENS = 375.0
                    LIGHTING-TYPE = SUS-FLUOR  LIGHTING-W/SQFT = 2.0
                    LIGHT-TO-SPACE = 1.0  LIGHTING-SCHEDULE = L_DININ_LI
                    EQUIP-SCHEDULE = L_DINING_P  EQUIPMENT-W/SQFT = 1.0
                    FURN-FRACTION = 0.3  FURN-WEIGHT = 0.6
                    INF-METHOD = NONE  ..

E-W  HEIGHT = 10.6  WIDTH = 97.0  CONS = EXWALL-2
     AZIMUTH = 135  SKY-FORM-FACTOR = 0.5
     GND-FORM-FACTOR = 0.5  ..

WINDOW HEIGHT = 8.0  WIDTH = 4.0  G-T = 1_PN_STD
MULTIPLIER = 18.0  SETBACK = 0.3
SKY-FORM-FACTOR = 0.5  GND-FORM-FACTOR = 0.5  ..

E-W  HEIGHT = 10.6  WIDTH = 86.3  CONS = EXWALL-2
     AZIMUTH = 45  SKY-FORM-FACTOR = 0.5
     GND-FORM-FACTOR = 0.5  ..

WINDOW HEIGHT = 8.0  WIDTH = 4.0  G-T = 1_PN_STD
MULTIPLIER = 6.0  SETBACK = 0.3
SKY-FORM-FACTOR = 0.5  GND-FORM-FACTOR = 0.5  ..

E-W  HEIGHT = 10.6  WIDTH = 97.0  CONS = EXWALL-2
     AZIMUTH = 315  SKY-FORM-FACTOR = 0.5
     GND-FORM-FACTOR = 0.5  ..

WINDOW HEIGHT = 8.0  WIDTH = 4.0  G-T = 1_PN_STD
MULTIPLIER = 18.0  SETBACK = 0.3
SKY-FORM-FACTOR = 0.5  GND-FORM-FACTOR = 0.5  ..

U-W  HEIGHT = 86.0  WIDTH = 85.5  CONS = FLOOR ..

I-W  HEIGHT = 86.0  WIDTH = 85.5  CONS = DROPCEIL
     NEXT-TO = dining-plm  ..

dining-plm =SPACE  AREA = 7353.4  VOLUME = 58827.2
                    TEMPERATURE = (73.)  ZONE-TYPE = UNCONDITIONED
                    PEOPLE-HG-LAT = 625.0  PEOPLE-HG-SENS = 375.0
                    LIGHTING-TYPE = SUS-FLUOR  LIGHT-TO-SPACE = 1.0
                    FURN-FRACTION = 0.3  FURN-WEIGHT = 0.6
                    INF-METHOD = NONE  ..

E-W  HEIGHT = 8.0  WIDTH = 86.3  CONS = EXWALL-2
     AZIMUTH = 45  SKY-FORM-FACTOR = 0.5
     GND-FORM-FACTOR = 0.5  ..

```

E-W HEIGHT = 8.0 WIDTH = 97.0 CONS = EXWALL-2  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 8.0 WIDTH = 97.0 CONS = EXWALL-2  
 AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 86.0 WIDTH = 85.5 CONS = ROOF-3  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
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# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*BASELINE SIMULATION FOR BLDG. 7245 \*  
 LINE-5 \*DINING AREA \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-B,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

# \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_W\_HT\_F =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_S\_CL\_F =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_27%\_OA =DAY-SCHEDULE (1,24) (0.27) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_10%\_OA =DAY-SCHEDULE (1,24) (0.1) ..  
 SD\_W\_CL\_F =DAY-SCHEDULE (1,24) (76.) ..  
 SD\_S\_HT\_F =DAY-SCHEDULE (1,24) (70.) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_W\_HT\_F =WEEK-SCHEDULE (ALL) SD\_W\_HT\_F ..

SW\_S\_CL\_F =WEEK-SCHEDULE (ALL) SD\_S\_CL\_F ..

SW\_27%\_OA =WEEK-SCHEDULE (ALL) SD\_27%\_OA ..

SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..



SW\_10%\_OA =WEEK-SCHEDULE (ALL) SD\_10%\_OA ..

SW\_W\_CL\_F =WEEK-SCHEDULE (ALL) SD\_W\_CL\_F ..

SW\_S\_HT\_F =WEEK-SCHEDULE (ALL) SD\_S\_HT\_F ..

S\_FULL\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

S\_FULL\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

\$ OUTSIDE AIR AT .27%

S\_OTSIDAIR =SCHEDULE THRU DEC 31 SW\_27%\_OA ..

\$ HEATING SEASON

S\_HE\_SCHED =SCHEDULE THRU MAY 15 SW\_ON  
THRU OCT 1 SW\_OFF  
THRU DEC 31 SW\_ON ..

\$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

\$ 10%OA\_WINTER\_100%OA\_SUM

S\_S/W\_VET =SCHEDULE THRU MAY 15 SW\_10%\_OA  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_10%\_OA ..

S\_VENT@27% =SCHEDULE THRU DEC 31 SW\_27%\_OA ..

\$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
THRU OCT 1 SW\_S\_HT\_F  
THRU DEC 31 SW\_W\_HT\_F ..

\$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
THRU OCT 1 SW\_S\_CL\_F  
THRU DEC 31 SW\_W\_CL\_F ..

S\_HRLY-RPT =SCHEDULE THRU JAN 10 SW\_OFF  
THRU JAN 11 SW\_ON  
THRU JUN 17 SW\_OFF  
THRU JUN 18 SW\_ON  
THRU DEC 31 SW\_OFF ..

#### \$ ZONE DESCRIPTION

diningarea =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL

BASEBOARD-CTRL = THERMOSTATIC  
 BASEBOARD-RATING = -235200. OUTSIDE-AIR-CFM = 3847.5  
 SIZING-OPTION = FROM-LOADS ..

dining-plm =ZONE DESIGN-HEAT-T = 64.0 DESIGN-COOL-T = 82.0  
 ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

VAV-SPEED =SYSTEM SYSTEM-TYPE = VAVS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE\_SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 OA-CONTROL = FIXED SUPPLY-CFM = 14250.  
 RATED-CFM = 14250. MIN-OUTSIDE-AIR = 0.27  
 MAX-OA-FRACTION = 0.27 FAN-CONTROL = SPEED  
 SUPPLY-DELTA-T = 2.4 SUPPLY-KW = 0.00078  
 FAN-PLACEMENT = BLOW-THROUGH MAX-FAN-RATIO = 1.0  
 MIN-FAN-RATIO = 0.27 NIGHT-CYCLE-CTRL = STAY-OFF  
 NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 0.27  
 REHEAT-DELTA-T = 70. COOLING-CAPACITY = 819545.  
 COOL-SH-CAP = 672000. COOL-FT-MIN = 0.  
 HEATING-CAPACITY = -51855200.  
 SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (diningarea, dining-plm) ..

## \$ HOURLY REPORT DESCRIPTION

ZONES-RPT =REPORT-BLOCK VARIABLE-TYPE = diningarea  
 VARIABLE-LIST = (17,18,7,31) ..  
 NEW-VAV =REPORT-BLOCK VARIABLE-TYPE = VAV-SPEED  
 VARIABLE-LIST = (3,5,6,9,17,20,39) ..  
 HRLY-RPT-1 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONES-RPT)  
 ..  
 HRLY-RPT-2 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (NEW-VAV)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*BASELINE SIMULATION FOR BLDG. 7245 \*

LINE-5 \*DINING AREA \* ..

ABORT                ERRORS ..  
 DIAGNOSTIC        WARNINGS ..  
 PLANT-REPORT      VERIFICATION=(PV-A)  
                   SUMMARY=(PS-B,BEPS)  
                   HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_ON        =DAY-SCHEDULE (1,24) (1.) ..

PD\_OFF       =DAY-SCHEDULE (1,24) (0.) ..

PW\_HEATOFF =WEEK-SCHEDULE (ALL) PD\_OFF ..

PW\_HEATON   =WEEK-SCHEDULE (ALL) PD\_ON ..

PW\_COOLOFF =WEEK-SCHEDULE (ALL) PD\_OFF ..

PW\_COOLON   =WEEK-SCHEDULE (ALL) PD\_ON ..

## \$ HEATING SEASON

P\_HEAT       =SCHEDULE THRU MAY 15 PW\_HEATON  
                   THRU OCT 1 PW\_HEATOFF  
                   THRU DEC 31 PW\_HEATON ..

## \$ COOLING SEASON

P\_COOL       =SCHEDULE THRU MAY 15 PW\_COOLOFF  
                   THRU OCT 1 PW\_COOLON  
                   THRU DEC 31 PW\_COOLOFF ..

## \$ EQUIPMENT DESCRIPTION

BOILER-STM =PLANT-EQUIPMENT    TYPE = STM-BOILER  
                   SIZE = -999. ..

CHILLER-RC =PLANT-EQUIPMENT    TYPE = HERM-REC-CHLR  
                   SIZE = -999. ..

PLANT-PARAMETERS    BOILER-FUEL = NATURAL-GAS    STM-BOILER-HIR = 1.33  
                   HERM-CENT-COND-TYPE = AIR    HERM-REC-COND-TYPE = AIR  
                   CCIRC-HEAD = 0.0    HCIRC-HEAD = 30.0 ..

ENERGY-RESOURCE      RESOURCE = ELECTRICITY ..  
 ENERGY-RESOURCE      RESOURCE = NATURAL-GAS ..

HEATINGSEA =LOAD-ASSIGNMENT    TYPE = HEATING  
                   OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = BOILER-STM  
NUMBER = 1 ..

COOLINGSEA =LOAD-ASSIGNMENT TYPE = COOLING  
OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = CHILLER-RC  
NUMBER = 1 ..

END ..  
COMPUTE PLANT ..  
STOP ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 11:33:43 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7245 DINING AREA  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

NUMBER OF EXTERIOR SURFACES 7 RECTANGULAR 7 OTHER 0  
 (U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED )

| SURFACE    | SPACE | U-VALUE<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) | W A L L<br>(BTU/HR-SQFT-F) | U-VALUE<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) | W A L L + G L A S S<br>(BTU/HR-SQFT-F) | U-VALUE<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) | AZIMUTH    |
|------------|-------|----------------------------|----------------|----------------------------|----------------------------|----------------|--|----------------------------|----------------|------------|
| diningarea |       | 1.021                      | 192.00         | 0.082                      | 0.082                      | 722.78         | 0.279                                  | 0.279                      | 914.78         | NORTH-EAST |
| dining-plm |       | 0.000                      | 0.00           | 0.082                      | 0.082                      | 690.40         | 0.082                                  | 0.082                      | 690.40         | NORTH-EAST |
| diningarea |       | 1.021                      | 576.00         | 0.082                      | 0.082                      | 452.20         | 0.608                                  | 0.608                      | 1028.20        | SOUTH-EAST |
| dining-plm |       | 0.000                      | 0.00           | 0.082                      | 0.082                      | 776.00         | 0.082                                  | 0.082                      | 776.00         | SOUTH-EAST |
| diningarea |       | 1.021                      | 576.00         | 0.082                      | 0.082                      | 452.20         | 0.608                                  | 0.608                      | 1028.20        | NORTH-EAST |
| dining-plm |       | 0.000                      | 0.00           | 0.082                      | 0.082                      | 776.00         | 0.082                                  | 0.082                      | 776.00         | NORTH-WEST |
| dining-plm |       | 0.000                      | 0.00           | 0.838                      | 0.838                      | 7353.00        | 0.838                                  | 0.838                      | 7353.00        | ROOF       |
| diningarea |       | 0.000                      | 0.00           | 0.020                      | 0.020                      | 7353.00        | 0.020                                  | 0.020                      | 7353.00        | UNDERGRND  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 11:33:43 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7245 DINING AREA  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

|             | AVERAGE<br>U-VALUE/GLASS<br>(BTU/HR-SQFT-F) | AVERAGE<br>U-VALUE/WALLS<br>(BTU/HR-SQFT-F) | AVERAGE U-VALUE<br>WALLS+GLASS<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | OPAQUE<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) |
|-------------|---|---|---|-------------------------|--------------------------|--------------------------------|
| NORTH-EAST  | 1.021                                       | 0.082                                       | 0.194   | 192.00                  | 1413.18                  | 1605.18                        |
| SOUTH-EAST  | 1.021                                       | 0.082                                       | 0.382   | 576.00                  | 1228.20                  | 1804.20                        |
| NORTH-WEST  | 1.021                                       | 0.082                                       | 0.382   | 576.00                  | 1228.20                  | 1804.20                        |
| ROOF        | 0.000                                       | 0.838                                       | 0.838   | 0.00                    | 7353.00                  | 7353.00                        |
| ALL WALLS   | 1.021                                       | 0.082                                       | 0.324   | 1344.00                 | 3869.58                  | 5213.58                        |
| WALLS+ROOFS | 1.021                                       | 0.577                                       | 0.625   | 1344.00                 | 11222.58                 | 12566.58                       |
| UNDERGRND   | 0.000                                       | 0.020                                       | 0.020   | 0.00                    | 7353.00                  | 7353.00                        |
| BUILDING    | 1.021                                       | 0.357                                       | 0.401   | 1344.00                 | 18575.58                 | 19919.58                       |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 11:33:43 LDL RUN 1  
DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7245 DINING AREA  
REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS

\*\*\* BUILDING \*\*\*

| FLOOR AREA           |         | 7353       | SQFT    | 683      | SQMT     |
|----------------------|---------|------------|---------|----------|----------|
| VOLUME               |         | 78436      | CUFT    | 2221     | CUMT     |
| COOLING LOAD         |         |            |         |          |          |
| =====                |         |            |         |          |          |
| TIME                 |         | JUL 23     | 7PM     |          |          |
| DRY-BULB TEMP        |         | 94F        | 34C     |          |          |
| WET-BULB TEMP        |         | 78F        | 26C     |          |          |
| HEATING LOAD         |         |            |         |          |          |
| =====                |         |            |         |          |          |
| JAN 28               |         | 4AM        |         |          |          |
| OF                   |         | -18C       |         |          |          |
| -2F                  |         | -19C       |         |          |          |
| SENSIBLE             |         |            |         |          |          |
| (KBTU/H)             |         | ( KW )     | LATENT  | (KBTU/H) | ( KW )   |
| -----                |         |            |         |          |          |
| WALLS                | 2.101   | 0.615      | 0.000   | 0.000    | -9.047   |
| ROOFS                | 0.000   | 0.000      | 0.000   | 0.000    | 0.000    |
| GLASS CONDUCTION     | 23.361  | 6.842      | 0.000   | 0.000    | -108.011 |
| GLASS SOLAR          | 71.431  | 20.920     | 0.000   | 0.000    | 2.054    |
| DOOR                 | 0.000   | 0.000      | 0.000   | 0.000    | 0.000    |
| INTERNAL SURFACES    | 0.000   | 0.000      | 0.000   | 0.000    | 0.000    |
| UNDERGROUND SURFACES | -1.320  | -0.387     | 0.000   | 0.000    | -4.222   |
| OCCUPANTS TO SPACE   | 57.211  | 16.756     | 117.843 | 34.513   | 4.102    |
| LIGHT TO SPACE       | 47.596  | 13.940     | 0.000   | 0.000    | 8.158    |
| EQUIPMENT TO SPACE   | 20.307  | 5.947      | 0.000   | 0.000    | 1.456    |
| PROCESS TO SPACE     | 0.000   | 0.000      | 0.000   | 0.000    | 0.000    |
| INFILTRATION         | 0.000   | 0.000      | 0.000   | 0.000    | 0.000    |
| -----                |         |            |         |          |          |
| TOTAL                | 220.687 | 64.634     | 117.843 | 34.513   | -105.509 |
| TOTAL LOAD           | 338.530 | KBTU/H     | 99.147  | KW       | -30.901  |
| TOTAL LOAD / AREA    | 46.04   | BTU/H.SQFT | 145.131 | W /SQMT  | 14.348   |
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\* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR \*  
\* LOADS \*  
\* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION \*  
\* IN CONSIDERATION \*  
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EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 11:33:43 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7245 DINING AREA  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR VAV-SPEED TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                      |                           |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|------------------------------|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -176.577                    | 15                      | 3                    | -9.F                 | -531.225                     | 9564.                     | 23.931                          |
| FEB   | 0.00000                     |                         |                      |                      | -128.939                    | 3                       | 4                    | -1.F                 | -472.075                     | 8675.                     | 30.359                          |
| MAR   | 0.00000                     |                         |                      |                      | -97.346                     | 3                       | 4                    | 13.F                 | -368.587                     | 10264.                    | 33.155                          |
| APR   | 0.00000                     |                         |                      |                      | -24.256                     | 5                       | 4                    | 29.F                 | -241.324                     | 13782.                    | 33.155                          |
| MAY   | 46.51511                    | 31                      | 18                   | 76.F                 | -4.302                      | 5                       | 4                    | 41.F                 | -135.301                     | 13048.                    | 33.155                          |
| JUN   | 115.57044                   | 28                      | 18                   | 76.F                 | 0.000                       |                         |                      |                      | 0.000                        | 10158.                    | 29.107                          |
| JUL   | 146.65900                   | 23                      | 18                   | 79.F                 | 0.000                       |                         |                      |                      | 0.000                        | 10661.                    | 29.805                          |
| AUG   | 144.33791                   | 21                      | 19                   | 76.F                 | 0.000                       |                         |                      |                      | 0.000                        | 10664.                    | 29.440                          |
| SEP   | 75.50708                    | 6                       | 18                   | 75.F                 | 0.000                       |                         |                      |                      | 0.000                        | 9779.                     | 28.828                          |
| OCT   | 1.62142                     | 1                       | 18                   | 68.F                 | -23.425                     | 20                      | 3                    | 25.F                 | -276.908                     | 13934.                    | 33.155                          |
| NOV   | 0.00000                     |                         |                      |                      | -80.243                     | 3                       | 4                    | 12.F                 | -363.117                     | 10742.                    | 33.155                          |
| DEC   | 0.00000                     |                         |                      |                      | -157.569                    | 15                      | 2                    | 2.F                  | -450.325                     | 9560.                     | 22.956                          |
| TOTAL | 530.210                     |                         |                      |                      | -692.657                    |                         |                      |                      | -531.225                     | 130833.                   | 33.155                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |                              |                           |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 11:33:43 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7245 DINING AREA  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR VAV-SPEED TOPEKA, KS

| MONTH  | HOURS           |                 |                   |          | HOURS             |                   |                     |                    | HOURS            |         |         |                   | COINCIDENT LOADS--                    |  |  |  |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|---------------------|--------------------|------------------|---------|---------|-------------------|---------------------------------------|--|--|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON<br>CYCLE ON | FANS ON<br>VENTING | FLOATING<br>WHEN | FANS ON | FANS ON | PEAK<br>(KBTU/HR) | HEATING<br>LOAD AT<br>COOLING<br>PEAK | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK |  |  |
| JAN    | 0               | 742             | 0                 | 2        | 744               | 0                 | 0                   | 0                  | 0                | 744     | 0       | 2                 | -230.204                              | 0.905                                  |  |  |
| FEB    | 0               | 662             | 0                 | 10       | 672               | 0                 | 0                   | 0                  | 0                | 672     | 0       | 10                | -231.760                              | 0.905                                  |  |  |
| MAR    | 0               | 662             | 0                 | 82       | 744               | 0                 | 0                   | 0                  | 0                | 744     | 0       | 82                | -223.600                              | 0.905                                  |  |  |
| APR    | 0               | 455             | 0                 | 265      | 720               | 0                 | 0                   | 0                  | 0                | 720     | 0       | 265               | -13.155                               | 10.494                                 |  |  |
| MAY    | 380             | 192             | 0                 | 172      | 360               | 384               | 0                   | 0                  | 0                | 744     | 0       | 172               | 0.000                                 | 28.465                                 |  |  |
| JUN    | 714             | 0               | 0                 | 6        | 0                 | 720               | 0                   | 0                  | 0                | 720     | 0       | 6                 | 0.000                                 | 28.750                                 |  |  |
| JUL    | 744             | 0               | 0                 | 0        | 0                 | 744               | 0                   | 0                  | 0                | 744     | 0       | 0                 | 0.000                                 | 29.510                                 |  |  |
| AUG    | 744             | 0               | 0                 | 0        | 0                 | 744               | 0                   | 0                  | 0                | 744     | 0       | 0                 | 0.000                                 | 29.440                                 |  |  |
| SEP    | 612             | 0               | 0                 | 108      | 720               | 720               | 0                   | 0                  | 0                | 744     | 0       | 108               | 0.000                                 | 28.764                                 |  |  |
| OCT    | 17              | 482             | 0                 | 245      | 720               | 24                | 0                   | 0                  | 0                | 744     | 0       | 245               | 0.000                                 | 24.599                                 |  |  |
| NOV    | 0               | 617             | 0                 | 103      | 720               | 0                 | 0                   | 0                  | 0                | 720     | 0       | 103               | -277.368                              | 0.905                                  |  |  |
| DEC    | 0               | 742             | 0                 | 2        | 744               | 0                 | 0                   | 0                  | 0                | 744     | 0       | 2                 | -271.582                              | 0.905                                  |  |  |
| ANNUAL | 3211            | 4554            | 0                 | 995      | 5424              | 3336              | 0                   | 0                  | 0                | 8760    | 0       | 995               |                                       |  |  |  |

EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOB-2.1D 5/15/1995 11:33:43 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7245 DINING AREA  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>40.835<br>90.187<br>31/ 7 | NATURAL-GAS<br>269.527<br>713.594<br>15/ 3 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 36.755<br>103.659<br>26/18               | 204.942<br>646.978<br>3/ 4                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 41.200<br>114.590<br>7/19                | 160.197<br>527.115<br>3/ 4                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 49.121<br>114.365<br>3/19                | 44.838<br>373.939<br>5/ 4                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 64.394<br>245.846<br>31/18               | 9.250<br>241.462<br>5/ 4                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 81.558<br>247.935<br>28/19               | 0.000<br>0.000<br>30/ 1                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 94.585<br>269.717<br>23/18               | 0.000<br>0.000<br>31/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 95.336<br>264.432<br>21/19               | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 65.677<br>248.220<br>6/18                | 0.000<br>0.000<br>30/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 50.466<br>174.332<br>1/18                | 44.248<br>417.411<br>20/ 3                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 41.896<br>113.933<br>7/19                | 133.389<br>520.663<br>3/ 4                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 40.646<br>90.187<br>31/19                | 245.676<br>622.136<br>15/ 2                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |  |  |
|     | ONE YEAR<br>USE/PEAK                             | 702.468<br>269.717                       | 1112.067<br>713.594                        |



EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 11:33:43 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7245 DINING AREA  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 39.34       | 1112.07     |
| SPACE COOL      | 216.41      | 0.00        |
| HVAC AUX        | 89.46       | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 283.97      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 73.28       | 0.00        |
| TOTAL           | 702.46      | 1112.07     |

TOTAL SITE ENERGY 1814.53 MBTU 246.8 KBTU/SQFT-YR GROSS-AREA 246.8 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 3221.58 MBTU 438.1 KBTU/SQFT-YR GROSS-AREA 438.1 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 13.7  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

E-W HEIGHT = 8.0 WIDTH = 97.0 CONS = EXWALL-2  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 8.0 WIDTH = 97.0 CONS = EXWALL-2  
 AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 86.0 WIDTH = 85.5 CONS = ROOF-3  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #1 NIGHT SETBACK FOR BLDG. 7245 \*

LINE-5 \*DINING AREA \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-B,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

# \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_W\_HT\_F =DAY-SCHEDULE (1,4) (55.)  
                                   (5,20) (74.)  
                                   (21,24) (55.) ..  
 SD\_S\_CL\_F =DAY-SCHEDULE (1,4) (85.)  
                                   (5,20) (72.)  
                                   (21,24) (85.) ..  
 SD\_27%\_OA =DAY-SCHEDULE (1,24) (0.27) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_10%\_OA =DAY-SCHEDULE (1,24) (0.1) ..  
 SD\_W\_CL\_F =DAY-SCHEDULE (1,4) (57.)  
                                   (5,20) (76.)  
                                   (21,24) (57.) ..  
 SD\_S\_HT\_F =DAY-SCHEDULE (1,4) (83.)  
                                   (5,20) (70.)  
                                   (21,24) (83.) ..  
 SD\_FAN\_CYC =DAY-SCHEDULE (1,4) (0.)  
                                   (5,20) (1.)



(21,24) (0.) ..

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SW_ON      =WEEK-SCHEDULE (ALL) SD_ON  ..

SW_W_HT_F  =WEEK-SCHEDULE (ALL) SD_W_HT_F ..

SW_S_CL_F  =WEEK-SCHEDULE (ALL) SD_S_CL_F ..

SW_27%_OA  =WEEK-SCHEDULE (ALL) SD_27%_OA ..

SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF  ..

SW_10%_OA  =WEEK-SCHEDULE (ALL) SD_10%_OA ..

SW_W_CL_F  =WEEK-SCHEDULE (ALL) SD_W_CL_F ..

SW_S_HT_F  =WEEK-SCHEDULE (ALL) SD_S_HT_F ..

SW_FAN_CYC =WEEK-SCHEDULE (ALL) SD_FAN_CYC ..


S_FULL_ON  =SCHEDULE THRU DEC 31 SW_ON  ..

S_FULL_OFF =SCHEDULE THRU DEC 31 SW_OFF ..

$ OUTSIDE AIR AT .27%
S_OTSIDAIR =SCHEDULE THRU DEC 31 SW_27%_OA ..

$ HEATING SEASON
S_HE_SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON  ..

$ COOLING SEASON
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF ..

$ 10%OA_WINTER_100%OA_SUM
S_S/W_VET  =SCHEDULE THRU MAY 15 SW_10%_OA
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_10%_OA ..

S_VENT@27% =SCHEDULE THRU DEC 31 SW_27%_OA ..

$ HEATING SET TEMP
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_W_HT_F
              THRU OCT  1 SW_S_HT_F
              THRU DEC 31 SW_W_HT_F ..

$ COOLING SET TEMP
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_W_CL_F
              THRU OCT  1 SW_S_CL_F
              THRU DEC 31 SW_W_CL_F ..

S_HRLY-RPT =SCHEDULE THRU JAN 14 SW_OFF

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THRU JAN 15 SW\_ON  
 THRU JUL 22 SW\_OFF  
 THRU JUL 23 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYCL = SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

#### \$ ZONE DESCRIPTION

diningarea =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 BASEBOARD-CTRL = THERMOSTATIC  
 BASEBOARD-RATING = -235200. OUTSIDE-AIR-CFM = 3847.5  
 SIZING-OPTION = FROM-LOADS ..

dining-plm =ZONE DESIGN-HEAT-T = 64.0 DESIGN-COOL-T = 82.0  
 ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

#### \$ SYSTEM DESCRIPTION

VAV-SPEED =SYSTEM SYSTEM-TYPE = VAVS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE\_SCHD  
 COOLING-SCHEDULE = S\_CL\_SCHD PREHEAT-T = 0.0  
 COOL-CONTROL = WARMEST OA-CONTROL = FIXED  
 SUPPLY-CFM = 14250. RATED-CFM = 14250.  
 MIN-OUTSIDE-AIR = 0.27 MAX-OA-FRACTION = 0.27  
 FAN-SCHEDULE = S\_FAN\_CYCL FAN-CONTROL = SPEED  
 SUPPLY-DELTA-T = 2.4 SUPPLY-KW = 0.00078  
 FAN-PLACEMENT = BLOW-THROUGH MAX-FAN-RATIO = 1.0  
 MIN-FAN-RATIO = 0.27 NIGHT-CYCLE-CTRL = STAY-OFF  
 NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 0.27  
 REHEAT-DELTA-T = 70. COOLING-CAPACITY = 819545.  
 COOL-SH-CAP = 672000. COOL-FT-MIN = 0.  
 HEATING-CAPACITY = -51855200.  
 SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (diningarea, dining-plm) ..

#### \$ HOURLY REPORT DESCRIPTION

ZONES-RPT =REPORT-BLOCK VARIABLE-TYPE = diningarea  
 VARIABLE-LIST = {17,18,7,6} ..

NEW-VAV =REPORT-BLOCK VARIABLE-TYPE = VAV-SPEED  
 VARIABLE-LIST = {3,5,6,9,17,20,39} ..

HRLY-RPT-1 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONES-RPT)

..

HRLY-RPT-2 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (NEW-VAV)

..

| EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13: 9:31 SDL RUN 1 |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
|--|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
| DENVER, CO RUN #1 NIGHT SETBACK FOR BLDG. 7245 DINING AREA TOPEKA, KS                                |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR VAV-SPEED  |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----  |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN  | 0.00000                     |                         |                      |                      | 0.000                                   | -112.867                    | 15                      | -8.F                 | -9.F                 | -549.511                                | 9337.                     | 23.592                          |
| FEB  | 0.00000                     |                         |                      |                      | 0.000                                   | -78.993                     | 3                       | -1.F                 | -2.F                 | -472.811                                | 8446.                     | 25.186                          |
| MAR  | 0.00000                     |                         |                      |                      | 0.000                                   | -52.957                     | 3                       | 15.F                 | 13.F                 | -367.356                                | 9981.                     | 33.155                          |
| APR  | 0.00000                     |                         |                      |                      | 0.000                                   | -8.426                      | 5                       | 31.F                 | 29.F                 | -210.532                                | 12260.                    | 33.155                          |
| MAY  | 47.95139                    | 31                      | 18                   | 90.F                 | 76.F                                    | -0.460                      | 5                       | 49.F                 | 43.F                 | -48.461                                 | 12111.                    | 33.155                          |
| JUN  | 115.30379                   | 28                      | 18                   | 89.F                 | 76.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 10453.                    | 29.883                          |
| JUL  | 143.86469                   | 23                      | 18                   | 95.F                 | 79.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 11019.                    | 30.665                          |
| AUG  | 140.15866                   | 21                      | 12                   | 91.F                 | 77.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 11009.                    | 30.231                          |
| SEP  | 77.55123                    | 6                       | 18                   | 91.F                 | 75.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 9957.                     | 29.645                          |
| OCT  | 1.67102                     | 1                       | 18                   | 83.F                 | 68.F                                    | -8.338                      | 20                      | 23.F                 | 22.F                 | -247.785                                | 12525.                    | 33.155                          |
| NOV  | 0.00000                     |                         |                      |                      | 0.000                                   | -42.488                     | 3                       | 13.F                 | 12.F                 | -345.743                                | 10116.                    | 33.155                          |
| DEC  | 0.00000                     |                         |                      |                      | 0.000                                   | -99.660                     | 13                      | 5.F                  | 4.F                  | -451.426                                | 9336.                     | 22.956                          |
| TOTAL  | 526.500                     |                         |                      |                      |   | -404.189                    |                         |                      |                      | -549.511                                | 126550.                   | 33.155                          |
| MAX  |                             |                         |                      |                      | 544.548                                 |                             |                         |                      |                      |   |                           |                                 |

H11-20

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13: 9:31 SDL RUN 1 |                          |                          |  |                            |                            |                  |                           |                           |                                      |  |  |
|--|--------------------------|--------------------------|--|----------------------------|----------------------------|------------------|---------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 7245 DINING AREA TOPEKA, KS                    |                          |                          |  |                            |                            |                  |                           |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR VAV-SPEED   |                          |                          |  |                            |                            |                  |                           |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----  |                          |                          |  |                            |                            |                  |                           |                           |                                      |  |  |
| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON | HOURS<br>CYCLE ON<br>FANS | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | --COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN  | 0                        | 494                      | 0  | 744                        | 0                          | 496              | 0                         | 0                         | 2                                    | 0.000  | 0.000  |
| FEB  | 0                        | 442                      | 0  | 672                        | 0                          | 448              | 0                         | 0                         | 6                                    | 0.000  | 0.000  |
| MAR  | 0                        | 416                      | 0  | 744                        | 0                          | 496              | 0                         | 0                         | 80                                   | 0.000  | 0.000  |
| APR  | 0                        | 190                      | 0  | 720                        | 0                          | 480              | 0                         | 0                         | 290                                  | 0.000  | 0.000  |
| MAY  | 254                      | 56                       | 0  | 360                        | 384                        | 496              | 0                         | 0                         | 186                                  | 0.000  | 29.241   |
| JUN  | 478                      | 0                        | 0  | 0                          | 720                        | 480              | 0                         | 0                         | 2                                    | 0.000  | 29.607   |
| JUL  | 496                      | 0                        | 0  | 0                          | 744                        | 496              | 0                         | 0                         | 0                                    | 0.000  | 30.440   |
| AUG  | 496                      | 0                        | 0  | 0                          | 744                        | 496              | 0                         | 0                         | 0                                    | 0.000  | 29.956   |
| SEP  | 411                      | 0                        | 0  | 0                          | 720                        | 480              | 0                         | 0                         | 69                                   | 0.000  | 29.545   |
| OCT  | 10                       | 202                      | 0  | 720                        | 24                         | 496              | 0                         | 0                         | 284                                  | 0.000  | 25.889   |
| NOV  | 0                        | 368                      | 0  | 720                        | 0                          | 480              | 0                         | 0                         | 112                                  | 0.000  | 0.000  |
| DEC  | 0                        | 496                      | 0  | 744                        | 0                          | 496              | 0                         | 0                         | 0                                    | 0.000  | 0.000  |
| ANNUAL   | 2145                     | 2664                     | 0  | 5424                       | 3336                       | 5840             | 0                         | 0                         | 1031                                 |  |  |

EMC ENGINEERS INC. 80227 EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13: 9:31 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #1 NIGHT SETBACK FOR BLDG. 7245 DINING AREA  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>37.422<br>90.593<br>31/ 7 | NATURAL-GAS<br>174.347<br>738.159<br>15/ 5 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.601<br>90.593<br>28/ 7                | 128.154<br>651.549<br>3/ 5                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.714<br>114.596<br>7/19                | 89.243<br>528.818<br>3/ 5                  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.651<br>114.384<br>3/19                | 16.226<br>338.480<br>5/ 5                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 60.196<br>256.095<br>31/18               | 1.336<br>93.816<br>5/ 9                    |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 78.864<br>258.493<br>28/18               | 0.000<br>0.000<br>30/ 1                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 89.645<br>281.323<br>23/18               | 0.000<br>0.000<br>31/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 90.220<br>274.738<br>21/19               | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 64.824<br>258.338<br>6/18                | 0.000<br>0.000<br>30/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 44.283<br>192.449<br>1/18                | 16.139<br>384.542<br>20/ 8                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.570<br>113.949<br>7/19                | 72.508<br>503.143<br>3/ 5                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.230<br>90.593<br>31/19                | 157.377<br>627.004<br>13/ 5                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |  |  |
|     | ONE YEAR<br>USE/PEAK                             | 654.220<br>281.323                       | 655.330<br>738.159                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13: 9:31 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 7245 DINING AREA  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 23.96       | 655.33      |
| SPACE COOL      | 198.17      | 0.00        |
| HVAC AUX        | 74.84       | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 283.97      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 73.28       | 0.00        |
| TOTAL           | 654.22      | 655.33      |

TOTAL SITE ENERGY 1309.55 MBTU 178.1 KBTU/SQFT-YR GROSS-AREA 178.1 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2619.96 MBTU 356.3 KBTU/SQFT-YR GROSS-AREA 356.3 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 15.2  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

E-W HEIGHT = 8.0 WIDTH = 97.0 CONS = EXWALL-2  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 8.0 WIDTH = 97.0 CONS = EXWALL-2  
 AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 86.0 WIDTH = 85.5 CONS = ROOF-3  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #2 DDC CONTROL FOR BLDG. 7245 \*

LINE-5 \*DINING AREA \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-B,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

# \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_W\_HT\_F =DAY-SCHEDULE (1,24) (70.) ..  
 SD\_S\_CL\_F =DAY-SCHEDULE (1,24) (76.) ..  
 SD\_27%\_OA =DAY-SCHEDULE (1,24) (0.27) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_10%\_OA =DAY-SCHEDULE (1,24) (0.1) ..  
 SD\_W\_CL\_F =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_S\_HT\_F =DAY-SCHEDULE (1,24) (74.) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_W\_HT\_F =WEEK-SCHEDULE (ALL) SD\_W\_HT\_F ..

SW\_S\_CL\_F =WEEK-SCHEDULE (ALL) SD\_S\_CL\_F ..

SW\_27%\_OA =WEEK-SCHEDULE (ALL) SD\_27%\_OA ..

SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..



SW\_10%\_OA =WEEK-SCHEDULE (ALL) SD\_10%\_OA ..

SW\_W\_CL\_F =WEEK-SCHEDULE (ALL) SD\_W\_CL\_F ..

SW\_S\_HT\_F =WEEK-SCHEDULE (ALL) SD\_S\_HT\_F ..

S\_FULL\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

S\_FULL\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

\$ OUTSIDE AIR AT .27%

S\_OTSIDAIR =SCHEDULE THRU DEC 31 SW\_27%\_OA ..

\$ HEATING SEASON

S\_HE\_SCHED =SCHEDULE THRU MAY 15 SW\_ON  
THRU OCT 1 SW\_OFF  
THRU DEC 31 SW\_ON ..

\$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

\$ 10%OA\_WINTER\_100%OA\_SUM

S\_S/W\_VET =SCHEDULE THRU MAY 15 SW\_10%\_OA  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_10%\_OA ..

S\_VENT@27% =SCHEDULE THRU DEC 31 SW\_27%\_OA ..

\$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
THRU OCT 1 SW\_S\_HT\_F  
THRU DEC 31 SW\_W\_HT\_F ..

\$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
THRU OCT 1 SW\_S\_CL\_F  
THRU DEC 31 SW\_W\_CL\_F ..

S\_HRLY-RPT =SCHEDULE THRU JAN 10 SW\_OFF  
THRU JAN 11 SW\_ON  
THRU JUN 17 SW\_OFF  
THRU JUN 18 SW\_ON  
THRU DEC 31 SW\_OFF ..

\$ ZONE DESCRIPTION

diningarea =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL

BASEBOARD-CTRL = THERMOSTATIC  
 BASEBOARD-RATING = -235200. OUTSIDE-AIR-CFM = 3847.5  
 SIZING-OPTION = FROM-LOADS ..

dining-plm =ZONE DESIGN-HEAT-T = 64.0 DESIGN-COOL-T = 82.0  
 ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

VAV-SPEED =SYSTEM SYSTEM-TYPE = VAVS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE\_SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 COOL-CONTROL = WARMEST OA-CONTROL = FIXED  
 SUPPLY-CFM = 14250. RATED-CFM = 14250.  
 MIN-OUTSIDE-AIR = 0.27 MAX-OA-FRACTION = 0.27  
 FAN-CONTROL = SPEED SUPPLY-DELTA-T = 2.4  
 SUPPLY-KW = 0.00078 FAN-PLACEMENT = BLOW-THROUGH  
 MAX-FAN-RATIO = 1.0 MIN-FAN-RATIO = 0.27  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 0.27 REHEAT-DELTA-T = 70.  
 COOLING-CAPACITY = 819545. COOL-SH-CAP = 672000.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -51855200.  
 SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (diningarea, dining-plm) ..

## \$ HOURLY REPORT DESCRIPTION

ZONES-RPT =REPORT-BLOCK VARIABLE-TYPE = diningarea  
 VARIABLE-LIST = (17,18,7,31) ..  
 NEW-VAV =REPORT-BLOCK VARIABLE-TYPE = VAV-SPEED  
 VARIABLE-LIST = (3,5,6,9,17,20,39) ..  
 HRLY-RPT-1 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONES-RPT)  
 ..  
 HRLY-RPT-2 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (NEW-VAV)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOB-2.1D 5/15/1995 13:13:30 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 7245 DINING AREA  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR VAV-SPEED TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -155.512                    | 15                      | 3                    | -8.F                 | -9.F                                    | 9594.                              | 26.098                          |
| FEB   | 0.00000                     |                         |                      |                      | -110.647                    | 3                       | 4                    | 0.F                  | -1.F                                    | 8769.                              | 33.155                          |
| MAR   | 0.00000                     |                         |                      |                      | -78.886                     | 3                       | 4                    | 16.F                 | 13.F                                    | 10721.                             | 33.155                          |
| APR   | 0.00000                     |                         |                      |                      | -15.722                     | 5                       | 4                    | 32.F                 | 29.F                                    | 14839.                             | 33.155                          |
| MAY   | 34.24094                    | 31                      | 18                   | 76.F                 | -1.914                      | 5                       | 4                    | 45.F                 | 41.F                                    | 13190.                             | 33.155                          |
| JUN   | 89.94861                    | 28                      | 18                   | 89.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 9795.                              | 26.776                          |
| JUL   | 117.22208                   | 23                      | 18                   | 95.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 10224.                             | 27.233                          |
| AUG   | 117.13194                   | 21                      | 19                   | 95.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 10237.                             | 26.965                          |
| SEP   | 55.42989                    | 6                       | 18                   | 91.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 9570.                              | 26.562                          |
| OCT   | 0.75739                     | 1                       | 18                   | 83.F                 | -13.349                     | 20                      | 3                    | 25.F                 | 25.F                                    | 14976.                             | 33.155                          |
| NOV   | 0.00000                     |                         |                      |                      | -63.977                     | 3                       | 4                    | 13.F                 | 12.F                                    | 11304.                             | 33.155                          |
| DEC   | 0.00000                     |                         |                      |                      | -136.924                    | 15                      | 2                    | 3.F                  | 2.F                                     | 9579.                              | 26.410                          |
| TOTAL | 414.731                     |                         |                      |                      | -576.931                    |                         |                      |                      | -498.022                                | 132799.                            | 33.155                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
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EMC ENGINEERS INC. 80227 EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:13:30 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #2 DDC CONTROL FOR BLDG. 7245 DINING AREA  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>40.170<br>89.981<br>18/18<br>36.339<br>114.294<br>26/19<br>41.774<br>114.524<br>7/19<br>52.094<br>114.328<br>3/19<br>59.456<br>220.263<br>31/18<br>69.878<br>221.955<br>28/19<br>81.649<br>241.116<br>23/18<br>82.798<br>236.533<br>21/19<br>56.183<br>222.332<br>6/18<br>52.768<br>153.582<br>1/18<br>42.882<br>113.882<br>7/19<br>39.917<br>90.175<br>28/18 | NATURAL-GAS<br>238.847<br>668.993<br>15/ 3<br>177.687<br>600.867<br>3/ 4<br>131.201<br>482.666<br>3/ 4<br>30.238<br>332.828<br>5/ 4<br>4.861<br>145.732<br>5/ 4<br>0.000<br>0.000<br>30/ 1<br>0.000<br>0.000<br>31/ 1<br>0.000<br>0.000<br>31/ 1<br>0.000<br>0.000<br>30/ 1<br>26.515<br>374.028<br>20/ 3<br>107.525<br>478.659<br>3/ 4<br>215.241<br>577.595<br>15/ 2 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 40.170<br>89.981<br>18/18  | 238.847<br>668.993<br>15/ 3  |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 36.339<br>114.294<br>26/19   | 177.687<br>600.867<br>3/ 4   |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 41.774<br>114.524<br>7/19  | 131.201<br>482.666<br>3/ 4   |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.094<br>114.328<br>3/19  | 30.238<br>332.828<br>5/ 4  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 59.456<br>220.263<br>31/18   | 4.861<br>145.732<br>5/ 4   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 69.878<br>221.955<br>28/19   | 0.000<br>0.000<br>30/ 1  |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 81.649<br>241.116<br>23/18   | 0.000<br>0.000<br>31/ 1  |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 82.798<br>236.533<br>21/19   | 0.000<br>0.000<br>31/ 1  |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 56.183<br>222.332<br>6/18  | 0.000<br>0.000<br>30/ 1  |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.768<br>153.582<br>1/18  | 26.515<br>374.028<br>20/ 3   |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.882<br>113.882<br>7/19  | 107.525<br>478.659<br>3/ 4   |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 39.917<br>90.175<br>28/18  | 215.241<br>577.595<br>15/ 2  |
|     | ONE YEAR<br>USE/PEAK                             | 655.911<br>241.116   | 932.115<br>668.993   |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:13:30 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 7245 DINING AREA  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 33.41       | 932.11      |
| SPACE COOL      | 169.06      | 0.00        |
| HVAC AUX        | 96.17       | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 283.97      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 73.28       | 0.00        |
| TOTAL           | 655.90      | 932.11      |

TOTAL SITE ENERGY 1588.03 MBTU 216.0 KBTU/SQFT-YR GROSS-AREA 216.0 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2901.82 MBTU 394.6 KBTU/SQFT-YR GROSS-AREA 394.6 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 18.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

E-W HEIGHT = 8.0 WIDTH = 97.0 CONS = EXWALL-2  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 8.0 WIDTH = 97.0 CONS = EXWALL-2  
 AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 86.0 WIDTH = 85.5 CONS = ROOF-3  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #3 ECONOMIZER FOR BLDG. 7245 \*

LINE-5 \*DINING AREA \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-B,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

# \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_W\_HT\_F =DAY-SCHEDULE (1,4) (55.)  
 (5,20) (74.)  
 (21,24) (55.) ..  
 SD\_S\_CL\_F =DAY-SCHEDULE (1,4) (85.)  
 (5,20) (72.)  
 (21,24) (85.) ..  
 SD\_27%\_OA =DAY-SCHEDULE (1,24) (0.27) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_10%\_OA =DAY-SCHEDULE (1,24) (0.1) ..  
 SD\_W\_CL\_F =DAY-SCHEDULE (1,4) (57.)  
 (5,20) (76.)  
 (21,24) (57.) ..  
 SD\_S\_HT\_F =DAY-SCHEDULE (1,4) (83.)  
 (5,20) (70.)  
 (21,24) (83.) ..  
 SD\_FAN\_CYC =DAY-SCHEDULE (1,4) (0.)  
 (5,20) (1.)

(21,24) (0.) ..

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SW_ON      =WEEK-SCHEDULE (ALL) SD_ON  ..

SW_W_HT_F  =WEEK-SCHEDULE (ALL) SD_W_HT_F ..

SW_S_CL_F  =WEEK-SCHEDULE (ALL) SD_S_CL_F ..

SW_27%_OA  =WEEK-SCHEDULE (ALL) SD_27%_OA ..

SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF  ..

SW_10%_OA  =WEEK-SCHEDULE (ALL) SD_10%_OA ..

SW_W_CL_F  =WEEK-SCHEDULE (ALL) SD_W_CL_F ..

SW_S_HT_F  =WEEK-SCHEDULE (ALL) SD_S_HT_F ..

SW_FAN_CYC =WEEK-SCHEDULE (ALL) SD_FAN_CYC ..

S_FULL_ON  =SCHEDULE THRU DEC 31 SW_ON  ..

S_FULL_OFF =SCHEDULE THRU DEC 31 SW_OFF ..

$ OUTSIDE AIR AT .27%
S_OTSIDAIR =SCHEDULE THRU DEC 31 SW_27%_OA ..

$ HEATING SEASON
S_HE_SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON  ..

$ COOLING SEASON
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF ..

$ 10%OA_WINTER_100%OA_SUM
S_S/W_VET  =SCHEDULE THRU MAY 15 SW_10%_OA
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_10%_OA ..

S_VENT@27% =SCHEDULE THRU DEC 31 SW_27%_OA ..

$ HEATING SET TEMP
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_W_HT_F
              THRU OCT  1 SW_S_HT_F
              THRU DEC 31 SW_W_HT_F ..

$ COOLING SET TEMP
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_W_CL_F
              THRU OCT  1 SW_S_CL_F
              THRU DEC 31 SW_W_CL_F ..

S_HRLY-RPT =SCHEDULE THRU JAN 14 SW_OFF

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THRU JAN 15 SW\_ON  
 THRU JUL 22 SW\_OFF  
 THRU JUL 23 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYCL = SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

# \$ ZONE DESCRIPTION

diningarea =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 BASEBOARD-CTRL = THERMOSTATIC  
 BASEBOARD-RATING = -235200. OUTSIDE-AIR-CFM = 3847.5  
 SIZING-OPTION = FROM-LOADS ..

dining-plm =ZONE DESIGN-HEAT-T = 64.0 DESIGN-COOL-T = 82.0  
 ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

# \$ SYSTEM DESCRIPTION

VAV-SPEED =SYSTEM SYSTEM-TYPE = VAVS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE\_SCH  
 COOLING-SCHEDULE = S\_CL\_SCH PREHEAT-T = 0.0  
ECONO-LIMIT-T = 75.0 COOL-CONTROL = WARMEST  
 SUPPLY-CFM = 14250. RATED-CFM = 14250.  
 MIN-OUTSIDE-AIR = 0.27 FAN-SCHEDULE = S\_FAN\_CYCL  
 FAN-CONTROL = SPEED SUPPLY-DELTA-T = 2.4  
 SUPPLY-KW = 0.00078 FAN-PLACEMENT = BLOW-THROUGH  
 MAX-FAN-RATIO = 1.0 MIN-FAN-RATIO = 0.27  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 0.27 REHEAT-DELTA-T = 70.  
 COOLING-CAPACITY = 819545. COOL-SH-CAP = 672000.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -51855200.  
 SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (diningarea, dining-plm) ..

# \$ HOURLY REPORT DESCRIPTION

ZONES-RPT =REPORT-BLOCK VARIABLE-TYPE = diningarea  
 VARIABLE-LIST = (17,18,7,6) ..  
 NEW-VAV =REPORT-BLOCK VARIABLE-TYPE = VAV-SPEED  
 VARIABLE-LIST = (3,5,6,9,17,20,39) ..  
 HRLY-RPT-1 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONES-RPT)  
 ..  
 HRLY-RPT-2 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (NEW-VAV)  
 ..  
 END ..



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:29:47 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. 7245 DINING AREA  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR VAV-SPEED TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                           |                                 |  |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|--|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |  |
| JAN   | 0.00000                     |                         |                      |                      | -112.858                    | 15                      | 5                    | -8.F                 | -549.511                                | 9337.                     | 23.592                          |  |
| FEB   | 0.00000                     |                         |                      |                      | -79.024                     | 3                       | 5                    | -1.F                 | -472.811                                | 8435.                     | 23.800                          |  |
| MAR   | 0.00000                     |                         |                      |                      | -54.457                     | 3                       | 5                    | 15.F                 | -367.356                                | 9487.                     | 33.155                          |  |
| APR   | 0.00000                     |                         |                      |                      | -11.409                     | 5                       | 5                    | 31.F                 | -218.186                                | 10752.                    | 33.155                          |  |
| MAY   | 43.22185                    | 31                      | 18                   | 90.F                 | -1.830                      | 5                       | 5                    | 44.F                 | -125.123                                | 11386.                    | 33.155                          |  |
| JUN   | 110.92410                   | 28                      | 18                   | 89.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 10444.                    | 29.882                          |  |
| JUL   | 141.68686                   | 23                      | 18                   | 95.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 11014.                    | 30.665                          |  |
| AUG   | 137.57155                   | 21                      | 12                   | 91.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 11003.                    | 30.231                          |  |
| SEP   | 74.55426                    | 6                       | 18                   | 91.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 9953.                     | 29.645                          |  |
| OCT   | 1.66097                     | 1                       | 18                   | 83.F                 | -11.876                     | 20                      | 8                    | 23.F                 | -250.028                                | 11242.                    | 33.155                          |  |
| NOV   | 0.00000                     |                         |                      |                      | -44.361                     | 3                       | 5                    | 13.F                 | -345.746                                | 9494.                     | 33.155                          |  |
| DEC   | 0.00000                     |                         |                      |                      | -99.660                     | 13                      | 5                    | 5.F                  | -451.426                                | 9336.                     | 22.956                          |  |
| TOTAL | 509.620                     |                         |                      |                      | -415.476                    |                         |                      |                      | -549.511                                | 121881.                   |                                 |  |
| TAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                           | 33.155                          |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:29:47 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. 7245 DINING AREA  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR VAV-SPEED TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |                            |                   |                            |                            |                              |                           |                                      |  | --COINCIDENT LOADS--                           |  |
|--------|---------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |
| JAN    | 0                         | 494                      | 0                          | 250               | 744                        | 0                          | 496                          | 0                         | 2                                    | 0.000  | 0.000  |  |
| FEB    | 0                         | 441                      | 0                          | 231               | 672                        | 0                          | 448                          | 0                         | 7                                    | 0.000  | 0.000  |  |
| MAR    | 0                         | 415                      | 0                          | 329               | 744                        | 0                          | 496                          | 0                         | 81                                   | 0.000  | 0.000  |  |
| APR    | 0                         | 155                      | 0                          | 565               | 720                        | 0                          | 480                          | 0                         | 325                                  | 0.000  | 0.000  |  |
| MAY    | 251                       | 48                       | 0                          | 445               | 360                        | 384                        | 496                          | 0                         | 197                                  | 0.000  | 29.241   |  |
| JUN    | 478                       | 0                        | 0                          | 242               | 0                          | 720                        | 480                          | 0                         | 2                                    | 0.000  | 29.606   |  |
| JUL    | 496                       | 0                        | 0                          | 248               | 0                          | 744                        | 496                          | 0                         | 0                                    | 0.000  | 30.440   |  |
| AUG    | 496                       | 0                        | 0                          | 248               | 0                          | 744                        | 496                          | 0                         | 0                                    | 0.000  | 29.956   |  |
| SEP    | 410                       | 0                        | 0                          | 310               | 0                          | 720                        | 480                          | 0                         | 70                                   | 0.000  | 29.544   |  |
| OCT    | 10                        | 173                      | 0                          | 561               | 720                        | 24                         | 496                          | 0                         | 313                                  | 0.000  | 25.888   |  |
| NOV    | 0                         | 356                      | 0                          | 364               | 720                        | 0                          | 480                          | 0                         | 124                                  | 0.000  | 0.000  |  |
| DEC    | 0                         | 496                      | 0                          | 248               | 744                        | 0                          | 496                          | 0                         | 0                                    | 0.000  | 0.000  |  |
| ANNUAL | 2141                      | 2578                     | 0                          | 4041              | 5424                       | 3336                       | 5840                         | 0                         | 1121                                 |  |  |  |

EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:29:47 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #3 ECONOMIZER FOR BLDG. 7245 DINING AREA  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>37.420<br>90.593<br>31/ 7 | NATURAL-GAS<br>174.332<br>738.159<br>15/ 5 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.420<br>90.593<br>31/ 7                | 174.332<br>738.159<br>15/ 5                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.564<br>90.593<br>28/ 7                | 128.187<br>651.549<br>3/ 5                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 36.112<br>113.205<br>28/12               | 91.578<br>528.818<br>3/ 5                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.715<br>113.205<br>30/18               | 20.909<br>347.987<br>5/ 5                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 56.308<br>256.093<br>31/18               | 3.640<br>227.109<br>5/ 5                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 77.435<br>258.484<br>28/18               | 0.000<br>0.000<br>30/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 89.047<br>281.323<br>23/18               | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 89.427<br>274.738<br>21/19               | 0.000<br>0.000<br>31/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 63.754<br>258.336<br>6/18                | 0.000<br>0.000<br>30/ 1                    |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 40.194<br>192.437<br>1/18                | 21.989<br>387.298<br>20/ 8                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 35.592<br>113.205<br>23/12               | 75.572<br>503.147<br>3/ 5                  |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 37.230<br>90.593<br>31/19                | 157.377<br>627.004<br>13/ 5                |
|     | ONE YEAR<br>USE/PEAK                             | 633.797<br>281.323                       | 673.584<br>738.159                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:29:47 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. 7245 DINING AREA  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 24.81       | 673.58      |
| SPACE COOL      | 192.83      | 0.00        |
| HVAC AUX        | 58.90       | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 283.97      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 73.28       | 0.00        |
| TOTAL           | 633.80      | 673.58      |

TOTAL SITE ENERGY 1307.38 MBTU 177.8 KBTU/SQFT-YR GROSS-AREA 177.8 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2576.88 MBTU 350.4 KBTU/SQFT-YR GROSS-AREA 350.4 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 5.5  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

E-W HEIGHT = 8.0 WIDTH = 97.0 CONS = EXWALL-2  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 8.0 WIDTH = 97.0 CONS = EXWALL-2  
 AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 86.0 WIDTH = 85.5 CONS = ROOF-3  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

\$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #4 NIGHT INFILTRATION FOR BLDG. 7245\*

LINE-5 \*DINING AREA \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-B,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

\$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_W\_HT\_F =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_S\_CL\_F =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_27%\_OA =DAY-SCHEDULE (1,4) (0.)

(5,20) (0.27)  
 (21,24) (0.) ..

SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_10%\_OA =DAY-SCHEDULE (1,24) (0.1) ..  
 SD\_W\_CL\_F =DAY-SCHEDULE (1,24) (76.) ..  
 SD\_S\_HT\_F =DAY-SCHEDULE (1,24) (70.) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_W\_HT\_F =WEEK-SCHEDULE (ALL) SD\_W\_HT\_F ..

SW\_S\_CL\_F =WEEK-SCHEDULE (ALL) SD\_S\_CL\_F ..

SW\_27%\_OA =WEEK-SCHEDULE (ALL) SD\_27%\_OA ..

SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_10%\_OA =WEEK-SCHEDULE (ALL) SD\_10%\_OA ..

SW\_W\_CL\_F =WEEK-SCHEDULE (ALL) SD\_W\_CL\_F ..

SW\_S\_HT\_F =WEEK-SCHEDULE (ALL) SD\_S\_HT\_F ..

S\_FULL\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

S\_FULL\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

\$ OUTSIDE AIR AT .27%

S\_OTSIDAIR =SCHEDULE THRU DEC 31 SW\_27%\_OA ..

\$ HEATING SEASON

S\_HE\_SCHD =SCHEDULE THRU MAY 15 SW\_ON  
THRU OCT 1 SW\_OFF  
THRU DEC 31 SW\_ON ..

\$ COOLING SEASON

S\_CL\_SCHD =SCHEDULE THRU MAY 15 SW\_OFF  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

\$ 10%OA\_WINTER\_100%OA\_SUM

S\_S/W\_VET =SCHEDULE THRU MAY 15 SW\_10%\_OA  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_10%\_OA ..

S\_VENT@27% =SCHEDULE THRU DEC 31 SW\_27%\_OA ..

\$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
THRU OCT 1 SW\_S\_HT\_F  
THRU DEC 31 SW\_W\_HT\_F ..

\$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
THRU OCT 1 SW\_S\_CL\_F  
THRU DEC 31 SW\_W\_CL\_F ..

S\_HRLY-RPT =SCHEDULE THRU JAN 10 SW\_OFF  
THRU JAN 11 SW\_ON  
THRU JUN 17 SW\_OFF  
THRU JUN 18 SW\_ON  
THRU DEC 31 SW\_OFF ..


\$ ZONE DESCRIPTION

diningarea =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F

ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 BASEBOARD-CTRL = THERMOSTATIC  
 BASEBOARD-RATING = -235200. OUTSIDE-AIR-CFM = 3847.5  
 SIZING-OPTION = FROM-LOADS ..

dining-plm =ZONE DESIGN-HEAT-T = 64.0 DESIGN-COOL-T = 82.0  
 ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

VAV-SPEED =SYSTEM SYSTEM-TYPE = VAVS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE\_SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 OA-CONTROL = FIXED SUPPLY-CFM = 14250.  
 RATED-CFM = 14250. MIN-AIR-SCH = S\_OTSIDAIR   
 MAX-OA-FRACTION = 0.27 FAN-CONTROL = SPEED  
 SUPPLY-DELTA-T = 2.4 SUPPLY-KW = 0.00078  
 FAN-PLACEMENT = BLOW-THROUGH MAX-FAN-RATIO = 1.0  
 MIN-FAN-RATIO = 0.27 NIGHT-CYCLE-CTRL = STAY-OFF  
 NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 0.27  
 REHEAT-DELTA-T = 70. COOLING-CAPACITY = 819545.  
 COOL-SH-CAP = 672000. COOL-FT-MIN = 0.  
 HEATING-CAPACITY = -51855200.  
 SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (diningarea, dining-plm) ..

## \$ HOURLY REPORT DESCRIPTION

ZONES-RPT =REPORT-BLOCK VARIABLE-TYPE = diningarea  
 VARIABLE-LIST = (17,18,7,31) ..  
 NEW-VAV =REPORT-BLOCK VARIABLE-TYPE = VAV-SPEED  
 VARIABLE-LIST = (3,5,6,9,17,20,39) ..  
 HRLY-RPT-1 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONES-RPT)  
 ..  
 HRLY-RPT-2 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (NEW-VAV)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*



EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:36:56 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. 7245 DINING AREA  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>38.910<br>88.968<br>31/7 | NATURAL-GAS<br>184.685<br>639.885<br>15/9 |
|-----|--|---|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 34.836<br>107.077<br>26/18              | 134.878<br>575.728<br>3/8                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 39.068<br>114.543<br>7/19               | 93.587<br>461.417<br>3/5                  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 44.021<br>114.322<br>3/19               | 18.606<br>310.065<br>5/5                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 61.805<br>245.752<br>31/18              | 2.776<br>87.774<br>5/9                    |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 80.023<br>247.874<br>28/19              | 0.000<br>0.000<br>30/1                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 90.753<br>269.631<br>23/18              | 0.000<br>0.000<br>31/1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 91.612<br>264.343<br>21/19              | 0.000<br>0.000<br>31/1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 67.091<br>248.110<br>6/18               | 0.000<br>0.000<br>30/1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 45.679<br>178.548<br>1/18               | 19.236<br>358.203<br>20/8                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 39.033<br>113.898<br>7/19               | 77.199<br>444.891<br>3/5                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 38.603<br>88.968<br>31/19               | 166.598<br>559.295<br>12/9                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |   |   |
|     | ONE YEAR<br>USE/PEAK                             | 671.435<br>269.631                      | 697.566<br>639.885                        |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:36:56 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. 7245DINING AREA  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 26.47       | 697.57      |
| SPACE COOL                                       | 209.65      | 0.00        |
| HVAC AUX   | 78.06       | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 283.97      | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 73.28       | 0.00        |
| TOTAL  | 671.43      | 697.57      |

TOTAL SITE ENERGY 1369.00 MBTU 186.2 KBTU/SQFT-YR GROSS-AREA 186.2 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2713.89 MBTU 369.1 KBTU/SQFT-YR GROSS-AREA 369.1 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 17.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

E-W HEIGHT = 8.0 WIDTH = 97.0 CONS = EXWALL-2  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 8.0 WIDTH = 97.0 CONS = EXWALL-2  
 AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 86.0 WIDTH = 85.5 CONS = ROOF-3  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #5 DAY INFILTRATION FOR BLDG. 7245 \*  
 LINE-5 \*DINING AREA \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-B,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

# \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_W\_HT\_F =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_S\_CL\_F =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_27%\_OA =DAY-SCHEDULE (1,4) (0.27)  
                                   (5,20) (0.)  
                                   (21,24) (0.27) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_10%\_OA =DAY-SCHEDULE (1,24) (0.1) ..  
 SD\_W\_CL\_F =DAY-SCHEDULE (1,24) (76.) ..  
 SD\_S\_HT\_F =DAY-SCHEDULE (1,24) (70.) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_W\_HT\_F =WEEK-SCHEDULE (ALL) SD\_W\_HT\_F ..

SW\_S\_CL\_F =WEEK-SCHEDULE (ALL) SD\_S\_CL\_F ..

SW\_27%\_OA =WEEK-SCHEDULE (ALL) SD\_27%\_OA ..

SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_10%\_OA =WEEK-SCHEDULE (ALL) SD\_10%\_OA ..

SW\_W\_CL\_F =WEEK-SCHEDULE (ALL) SD\_W\_CL\_F ..

SW\_S\_HT\_F =WEEK-SCHEDULE (ALL) SD\_S\_HT\_F ..

S\_FULL\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

S\_FULL\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

\$ OUTSIDE AIR AT .27%

S\_OTSIDAIR =SCHEDULE THRU DEC 31 SW\_27%\_OA ..

\$ HEATING SEASON

S\_HE\_SCHED =SCHEDULE THRU MAY 15 SW\_ON  
THRU OCT 1 SW\_OFF  
THRU DEC 31 SW\_ON ..

\$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

\$ 10%OA\_WINTER\_100%OA\_SUM

S\_S/W\_VET =SCHEDULE THRU MAY 15 SW\_10%\_OA  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_10%\_OA ..

S\_VENT@27% =SCHEDULE THRU DEC 31 SW\_27%\_OA ..

\$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
THRU OCT 1 SW\_S\_HT\_F  
THRU DEC 31 SW\_W\_HT\_F ..

\$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
THRU OCT 1 SW\_S\_CL\_F  
THRU DEC 31 SW\_W\_CL\_F ..

S\_HRLY-RPT =SCHEDULE THRU JAN 10 SW\_OFF  
THRU JAN 11 SW\_ON  
THRU JUN 17 SW\_OFF  
THRU JUN 18 SW\_ON  
THRU DEC 31 SW\_OFF ..


\$ ZONE DESCRIPTION

diningarea =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F

ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 BASEBOARD-CTRL = THERMOSTATIC  
 BASEBOARD-RATING = -235200. OUTSIDE-AIR-CFM = 3847.5  
 SIZING-OPTION = FROM-LOADS ..

dining-plm =ZONE DESIGN-HEAT-T = 64.0 DESIGN-COOL-T = 82.0  
 ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

VAV-SPEED =SYSTEM SYSTEM-TYPE = VAVS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE\_SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 OA-CONTROL = FIXED SUPPLY-CFM = 14250.  
 RATED-CFM = 14250. MIN-AIR-SCH = S\_OTSIDAIR   
 MAX-OA-FRACTION = 0.27 FAN-CONTROL = SPEED  
 SUPPLY-DELTA-T = 2.4 SUPPLY-KW = 0.00078  
 FAN-PLACEMENT = BLOW-THROUGH MAX-FAN-RATIO = 1.0  
 MIN-FAN-RATIO = 0.27 NIGHT-CYCLE-CTRL = STAY-OFF  
 NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 0.27  
 REHEAT-DELTA-T = 70. COOLING-CAPACITY = 819545.  
 COOL-SH-CAP = 672000. COOL-FT-MIN = 0.  
 HEATING-CAPACITY = -51855200.  
 SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (diningarea, dining-plm) ..

## \$ HOURLY REPORT DESCRIPTION

ZONES-RPT =REPORT-BLOCK VARIABLE-TYPE = diningarea  
 VARIABLE-LIST = (17,18,7,31) ..  
 NEW-VAV =REPORT-BLOCK VARIABLE-TYPE = VAV-SPEED  
 VARIABLE-LIST = (3,5,6,9,17,20,39) ..  
 HRLY-RPT-1 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONES-RPT)  
 ..  
 HRLY-RPT-2 = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (NEW-VAV)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:43:13 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. 7245 DINING AREA  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR VAV-SPEED TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                           |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -69.555                     | 15                      | -8. F                | -9. F                | -529.002                                | 10302.                    | 33.155                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -47.931                     | 3                       | 0. F                 | -1. F                | -465.109                                | 9391.                     | 33.155                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -33.805                     | 3                       | 16. F                | 13. F                | -352.820                                | 10517.                    | 33.155                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -6.469                      | 5                       | 32. F                | 29. F                | -192.750                                | 11865.                    | 33.155                          |
| MAY   | 54.52324                    | 16                      | 57. F                | 56. F                | 443.307                                 | -0.743                      | 5                       | 45. F                | 41. F                | -64.299                                 | 11673.                    | 33.155                          |
| JUN   | 112.72626                   | 28                      | 89. F                | 75. F                | 354.799                                 | 0.000                       |                         |                      |                      | 0.000                                   | 10127.                    | 28.934                          |
| JUL   | 127.59078                   | 23                      | 94. F                | 78. F                | 366.129                                 | 0.000                       |                         |                      |                      | 0.000                                   | 10614.                    | 29.561                          |
| AUG   | 126.62223                   | 21                      | 95. F                | 76. F                | 360.590                                 | 0.000                       |                         |                      |                      | 0.000                                   | 10613.                    | 29.229                          |
| SEP   | 89.28371                    | 7                       | 91. F                | 74. F                | 347.865                                 | 0.000                       |                         |                      |                      | 0.000                                   | 9777.                     | 28.657                          |
| OCT   | 2.29905                     | 1                       | 83. F                | 68. F                | 262.367                                 | -5.327                      | 20                      | 25. F                | 25. F                | -226.390                                | 12334.                    | 33.155                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -28.134                     | 3                       | 13. F                | 12. F                | -339.738                                | 10549.                    | 33.155                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -60.660                     | 15                      | 3. F                 | 2. F                 | -443.608                                | 10376.                    | 33.155                          |
| TOTAL | 513.046                     |                         |                      |                      |   | -252.624                    |                         |                      |                      | -529.002                                | 128140.                   |                                 |
| MAX   |                             |                         |                      |                      | 443.307                                 |                             |                         |                      |                      |   |                           | 33.155                          |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:43:13 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. 7245 DINING AREA  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR VAV-SPEED TOPEKA, KS

| MONTH | HOURS |  | HOURS |  | N U M B E R |  | H O U R S |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  |  |  |
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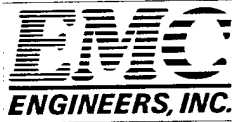
EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:43:13 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. 7245 DINING AREA  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR | ELECTRICITY<br>38.580<br>113.205<br>21/18 | NATURAL-GAS<br>108.846<br>710.608<br>15/ 3 |
|-----|--|---|--|
| JAN | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 34.792<br>113.204<br>23/ 6                | 78.086<br>638.587<br>3/ 4                  |
| FEB | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 38.153<br>113.204<br>21/ 6                | 57.675<br>508.105<br>3/ 4                  |
| MAR | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 41.191<br>113.204<br>21/ 6                | 14.073<br>313.486<br>5/ 4                  |
| APR | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 61.025<br>222.687<br>16/ 6                | 2.727<br>120.996<br>5/ 4                   |
| MAY | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 79.042<br>219.717<br>28/19                | 0.000<br>0.000<br>30/ 1                    |
| JUN | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 86.861<br>231.010<br>23/19                | 0.000<br>0.000<br>31/ 1                    |
| JUL | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 87.800<br>231.259<br>11/18                | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 69.464<br>219.735<br>7/18                 | 0.000<br>0.000<br>30/ 1                    |
| SEP | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 43.686<br>179.602<br>1/18                 | 12.315<br>355.228<br>20/ 4                 |
| OCT | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 37.973<br>113.205<br>5/ 6                 | 48.937<br>492.579<br>3/ 4                  |
| NOV | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 38.657<br>113.205<br>13/18                | 97.019<br>613.988<br>15/ 2                 |
| DEC | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 657.225<br>231.259                        | 419.678<br>710.608                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 13:43:13 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. 7245 DINING AREA  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 14.98       | 419.68      |
| SPACE COOL      | 204.72      | 0.00        |
| HVAC AUX        | 80.26       | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 283.97      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 73.28       | 0.00        |
| TOTAL           | 657.21      | 419.68      |

TOTAL SITE ENERGY 1076.90 MBTU 146.4 KBTU/SQFT-YR GROSS-AREA 146.4 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2393.33 MBTU 325.5 KBTU/SQFT-YR GROSS-AREA 325.5 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 34.6  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

BUILDING NO.:  
BLDG. TYPE:

7245

ENL PERS DINING FACILITY - KITCHEN AREA

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

### ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1 | RUN2    | RUN3 | RUN4 | RUN5 |
|----------------|---------|------|---------|------|------|------|
| HEATING (MBtu) | 806.4   | 0.0  | 798.5   | 0.0  | 0.0  | 0.0  |
| COOLING (kWH)  | 266,156 | 0    | 265,930 | 0    | 0    | 0    |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 15,600 CFM                        |
| FLOOR AREA     | 3,954 FT²                         |
| CFM/F          | 15600 CFM                         |
| UA             | 813 BTU/HR-°F                     |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

#### EZDOE COMPUTER RUN DEFINITION:

|         |                             |
|---------|-----------------------------|
| BASERUN | EXISTING OPERATION          |
| RUN1    | NIGHT SETBACK               |
| RUN2    | DDC CONTROL                 |
| RUN3    | ECONOMIZER                  |
| RUN4    | NIGHTTIME INFILTRATION (OA) |
| RUN5    | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      |            | ANNUAL HEATING & COOLING HOURS |            |
|--------------------|-------------------|------|------------|--------------------------------|------------|
| M-F                | 500               | 2400 | 95 HR      | HR. ON HEATING                 | 4313 HR/YR |
| SAT.               | 500               | 2400 | 19 HR      | HR. ON COOLING                 | 2622 HR/YR |
| SUN.               | 500               | 2400 | 19 HR      | HR. OFF HEATING                | 1135 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 133 HR/WK  | HR. OFF COOLING                | 690 HR/YR  |
|                    | TOTAL UNOCC. HR.  |      | 35 HR/WK   |                                |            |
|                    | ANNUAL OCCUPY HR. |      | 6935 HR/YR |                                |            |
|                    | ANNUAL UNOCC. HR. |      | 1825 HR/YR |                                |            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY

PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

|                      |      |   |      |   |            |
|----------------------|------|---|------|---|------------|
| HRS SAVED (HTG ONLY) | 5448 | - | 4313 | = | 1135 HR/YR |
| HRS SAVED (CLG ONLY) | 3312 | - | 2622 | = | 690 HR/YR  |

|           |   |   |               |   |                     |
|-----------|---|---|---------------|---|---------------------|
| HOAUHC    | 806.35 MBtu   | - | 0 MBtu        | = | 0.00E+00 Btu/CFM-HR |
|           | 15600 CFM   | x | 1825 HR/YR    |   |                     |
| HOAUH     | 806.35 MBtu   | - | 0 MBtu        | = | 0.00E+00 Btu/CFM-HR |
|           | 15600 CFM   | x | 1135 HR/YR    |   |                     |
| COAUHC    | 266,155.9 kWH   | - | 0.0 kWH       | = | 0.00E+00 kWH/CFM-HR |
|           | 15600 CFM   | x | 1825 HR/YR    |   |                     |
| COAUC     | 266,155.9 kWH   | - | 0.0 kWH       | = | 0.00E+00 kWH/CFM-HR |
|           | 15600 CFM   | x | 690 HR/YR     |   |                     |
| HOAOHC    | 806.35 MBtu   | - | 0 MBtu        | = | 0.00E+00 Btu/CFM-HR |
|           | 15600 CFM   | x | 6935 HR/YR    |   |                     |
| HOAOH     | 806.35 MBtu   | - | 0 MBtu        | = | 0.00E+00 Btu/CFM-HR |
|           | 15600 CFM   | x | 4313 HR/YR    |   |                     |
| COAOHC    | 266,155.9 kWH   | - | 0.0 kWH       | = | 0.00E+00 kWH/CFM-HR |
|           | 15600 CFM   | x | 6935 HR/YR    |   |                     |
| COAOC     | 266,155.9 kWH   | - | 0.0 kWH       | = | 0.00E+00 kWH/CFM-HR |
|           | 15600 CFM   | x | 2622 HR/YR    |   |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | = | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | = | 0.17                |
| ECC       | 0.0 kWH   | - | 0.0 kWH       | = | 0.00E+00 kWH/CFM-HR |
|           | 15600 CFM   | x | 2622 HR/YR    |   |                     |
| ECHC      | 0.0 kWH   | - | 0.0 kWH       | = | 0.00E+00 kWH/CFM-HR |
|           | 15600 CFM   | x | 6935 HR/YR    |   |                     |
| NSUCHC    | 266,155.9 kWH   | - | 0.0 kWH       | = | 0.00E+00 kWH/CFM-HR |
|           | 15600 CFM   | x | 1825 HR/YR    |   |                     |
| NSUCC     | 266,155.9 kWH   | - | 0.0 kWH       | = | 0.00E+00 kWH/CFM-HR |
|           | 15600 CFM   | x | 690 HR/YR     |   |                     |
| DDCCHC    | 266,155.9 kWH   | - | 265,930.3 kWH | = | 2.09E-06 kWH/CFM-HR |
|           | 15600 CFM   | x | 6935 HR/YR    |   |                     |
| DDCCC     | 266,155.9 kWH   | - | 265,930.3 kWH | = | 5.52E-06 kWH/CFM-HR |
|           | 15600 CFM   | x | 2622 HR/YR    |   |                     |
| NSC       | 806.35 MBtu   | - | 0 MBtu        | = | 9.92E+05 Btu/UA     |
|           | 813.24044 UA  |   |               |   |                     |
| DDCH      | 806.35 MBtu   | - | 798.51 MBtu   | = | 9.64E+03 Btu/UA     |
|           | 813.24044 UA  |   |               |   |                     |
| OPT       | ( 2 HR/DAY X 240 DAY/YR )                             | - | 175 HR/YR     | = | 305 HR/YR           |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               | = | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01          | = | 5.67 HR/YR          |





INPUT LOADS ..

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$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

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## \$ GENERAL PROJECT DATA

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TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BULIDING 7245      *
        LINE-5 *KITCHEN AREA                                * ..

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ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
LOADS-REPORT VERIFICATION=(LV-D)
            SUMMARY=(LS-C,LS-D)
            HOURLY-DATA-SAVE = YES ..
BUILDING-LOCATION LATITUDE = 39.0
                LONGITUDE = 96.5
                ALTITUDE = 1065.
                TIME-ZONE = 6
                GROSS-AREA = 3960
                SHIELDING-COEF = 0.29
                X-REF = 0.0
                Y-REF = 0.0 ..
RUN-PERIOD  JAN 1 1994 THRU DEC 31 1994 ..

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## \$ SCHEDULES

```

LD_ON      =DAY-SCHEDULE (1,24) (1.) ..
LD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

LD_KIT-PEO =DAY-SCHEDULE (1,4) (0.)
                    (5,19) (1.)
                    (20,24) (0.07) ..

LD_KIT-EQP =DAY-SCHEDULE (1,4) (0.)
                    (5,7) (0.75)
                    (8,9) (0.3)
                    (10,11) (0.1,0.3)
                    (12,13) (0.75)
                    (14,16) (0.5,0.1,0.3)
                    (17,18) (0.75)
                    (19,20) (0.3,0.2)
                    (21,24) (0.15) ..

LD_LIT-KIT =DAY-SCHEDULE (1,4) (0.1)
                    (5,24) (1.) ..

```

LW\_ON =WEEK-SCHEDULE (ALL) LD\_ON ..  
 LW\_OFF =WEEK-SCHEDULE (ALL) LD\_OFF ..  
 LW\_KIT-PEO =WEEK-SCHEDULE (ALL) LD\_KIT-PEO ..  
 LW\_KIT-EQP =WEEK-SCHEDULE (ALL) LD\_KIT-EQP ..  
 LW\_LIT-KIT =WEEK-SCHEDULE (ALL) LD\_LIT-KIT ..

## \$ ON 100% LOADS

L\_ON =SCHEDULE THRU DEC 31 LW\_ON ..

## \$ OFF 100% LOADS

L\_OFF =SCHEDULE THRU DEC 31 LW\_OFF ..

## \$ PEOPLE LOAD FOR KITCHEN

L\_KIT-PEOP =SCHEDULE THRU DEC 31 LW\_KIT-PEO ..

## \$ EQUIPMENT LOAT FOR KITC

L\_KIT-EQUP =SCHEDULE THRU DEC 31 LW\_KIT-EQP ..

## \$ LIGHTING SCHED FOR KITC

L\_KIT-LIT =SCHEDULE THRU DEC 31 LW\_LIT-KIT ..

## \$ CONSTRUCTION TYPES

## \$ EXTERIOR WALL BRICK,INSL,BRICK

WALL-1 =LAYERS MATERIAL=(BK01,AL11,IN35,CB06,GP01) I-F-R= 0.6100  
 THICKNESS=(0.333,0.000,0.167,0.500,0.042) ..  
 EXWALL-1 =CONSTRUCTION LAYERS = WALL-1  
 ABSORPTANCE = 0.880  
 ROUGHNESS = 2 ..  
 FLOOR =CONSTRUCTION U-VALUE = 0.020  
 ABSORPTANCE = 0.610  
 ROUGHNESS = 5 ..

## \$ BUILT-UP ROOF W/INSL&amp; NO CEILING

BLT-ROOF =LAYERS MATERIAL=(HF-E2,HF-E3,HF-A3,IN02)  
 THICKNESS=(0.042,0.031,0.005,0.296) ..  
 ROOF-1 =CONSTRUCTION LAYERS = BLT-ROOF  
 ABSORPTANCE = 0.800  
 ROUGHNESS = 1 ..

## \$ CONCRETE CEILING BETW KIT &amp; MEZZ

CONC-CEL =LAYERS MATERIAL=(CC24)  
 THICKNESS=(0.333) ..  
 IN-WALL1 =CONSTRUCTION LAYERS = CONC-CEL  
 ABSORPTANCE = 0.650

ROUGHNESS = 5 ..

## \$ STANDARD METAL DOOR

DOOR-MET =CONSTRUCTION U-VALUE = 0.020  
 ABSORPTANCE = 0.860  
 ROUGHNESS = 5 ..

1\_PN\_STD =GLASS-TYPE GLASS-TYPE-CODE = 1  
 PANES = 1 ..

## \$ SPACE DESCRIPTION

KITCHEN =SPACE AREA = 3954.4 VOLUME = 41916.6  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_KIT-PEOP NUMBER-OF-PEOPLE = 20.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 0.65  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_KIT-LIT  
 EQUIP-SCHEDULE = L\_KIT-EQUP EQUIPMENT-W/SQFT = 8.35  
 FURN-WEIGHT = 0.8 INF-METHOD = NONE ..

E-W HEIGHT = 10.6 WIDTH = 86.3 CONS = EXWALL-1  
 AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.8 WIDTH = 6.0 G-T = 1\_PN\_STD  
 MULTIPLIER = 4.0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
 SETBACK = 0.2 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 10.6 WIDTH = 39.0 CONS = EXWALL-1  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.0 WIDTH = 5.3 G-T = 1\_PN\_STD  
 MULTIPLIER = 2.0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 10.6 WIDTH = 39.0 CONS = EXWALL-1  
 AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.0 WIDTH = 4.0 G-T = 1\_PN\_STD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 60.0 WIDTH = 66.0 CONS = FLOOR ..

I-W HEIGHT = 60.0 WIDTH = 66.0 CONS = IN-WALL1  
 NEXT-TO = KIT-MEZZIN ..

KIT-MEZZIN =SPACE AREA = 3954.4 VOLUME = 35589.6  
 TEMPERATURE = (73.) ZONE-TYPE = UNCONDITIONED  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHT-TO-SPACE = 1.0  
 EQUIP-SCHEDULE = L\_ON EQUIPMENT-KW = 3.68  
 FURN-WEIGHT = 0.8 INF-METHOD = NONE ..

E-W HEIGHT = 9.0 WIDTH = 86.3 CONS = EXWALL-1  
 AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 9.0 WIDTH = 39.0 CONS = EXWALL-1  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 9.0 WIDTH = 39.0 CONS = EXWALL-1  
 AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 60.0 WIDTH = 66.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*BASELINE SIMULATION FOR BULIDING 7245 \*  
 LINE-5 \*KITCHEN AREA \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_W\_HT\_F =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_S\_CL\_F =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_EXHAUST =DAY-SCHEDULE (1,4) (0.)  
 (5,24) (1.) ..

```

SD_W_CL_F  =DAY-SCHEDULE (1,24) (76.) ..
SD_S_HT_F  =DAY-SCHEDULE (1,24) (70.) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON  ..

SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_W_HT_F  =WEEK-SCHEDULE (ALL) SD_W_HT_F ..

SW_S_CL_F  =WEEK-SCHEDULE (ALL) SD_S_CL_F ..

SW_EXHAUST =WEEK-SCHEDULE (ALL) SD_EXHAUST ..

SW_W_CL_F  =WEEK-SCHEDULE (ALL) SD_W_CL_F ..

SW_S_HT_F  =WEEK-SCHEDULE (ALL) SD_S_HT_F ..

```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON  ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..
```

## \$ HEATING SEASON

```

S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON  ..

```

## \$ COOLING SEASON

```

S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF  ..

```

## \$ HEATING SET TEMP

```

S_HT_SET_F =SCHEDULE THRU MAY 15 SW_W_HT_F
              THRU OCT  1 SW_S_HT_F
              THRU DEC 31 SW_W_HT_F  ..

```

## \$ COOLING SET TEMP

```

S_CL_SET_F =SCHEDULE THRU MAY 15 SW_W_CL_F
              THRU OCT  1 SW_S_CL_F
              THRU DEC 31 SW_W_CL_F  ..

```

## \$ SCHEDULE OF EXHAUST

```
S_EXHAUST =SCHEDULE THRU DEC 31 SW_EXHAUST ..
```

```

S_HRLY-RPS =SCHEDULE THRU JAN 15 SW_OFF
              THRU JAN 16 SW_ON
              THRU AUG 26 SW_OFF
              THRU AUG 27 SW_ON
              THRU DEC 31 SW_OFF  ..

```

## \$ ZONE DESCRIPTION

```

KITCHEN    =ZONE    DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
              HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
              ZONE-TYPE = CONDITIONED
              THERMOSTAT-TYPE = PROPORTIONAL
              BASEBOARD-CTRL = THERMOSTATIC
              BASEBOARD-RATING = -35500.  SIZING-OPTION = FROM-LOADS  ..

KIT-MEZZIN =ZONE    DESIGN-HEAT-T = 67.0  DESIGN-COOL-T = 82.0
              ZONE-TYPE = UNCONDITIONED  SIZING-OPTION = FROM-LOADS  ..

```

## \$ SYSTEM DESCRIPTION

```

KIT_H&VS    =SYSTEM  SYSTEM-TYPE = HVSYS
              MAX-SUPPLY-T = 120.0  HEATING-SCHEDULE = S_ON
              OA-CONTROL = FIXED  SUPPLY-CFM = 15000.
              RETURN-CFM = 15000.  RATED-CFM = 15000.
              MIN-OUTSIDE-AIR = 1.0  MIN-AIR-SCH = S_ON
              RECOVERY-EFF = 0.7  FAN-SCHEDULE = S_ON
              SUPPLY-DELTA-T = 2.4  SUPPLY-KW = 0.00078
              MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
              NIGHT-CYCLE-CTRL = STAY-OFF  RETURN-STATIC = 0.25
              RETURN-EFF = 0.75  NIGHT-VENT-DT = 0.0
              HEATING-CAPACITY = -900000.
              ZONE-NAMES = (KITCHEN, KIT-MEZZIN)  ..

```

## \$ HOURLY REPORT DESCRIPTION

```

ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = KITCHEN
              VARIABLE-LIST = (17,18,7,31,15,11,14)  ..
AHU-BLOCK  =REPORT-BLOCK VARIABLE-TYPE = KIT_H&VS
              VARIABLE-LIST = (3,5,6,17)  ..
ZONE-HRLY  = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPS
              REPORT-BLOCK = (ZONE-BLOCK)
..
AHU-HRLY   = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPS
              REPORT-BLOCK = (AHU-BLOCK)
..
END  ..
COMPUTE SYSTEMS  ..

INPUT PLANT  ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
      LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
      LINE-3 *      DENVER,      CO      80227      *

```

LINE-4 \*BASELINE SIMULATION FOR BULIDING 7245 \*

LINE-5 \*KITCHEN AREA \* ..

ABORT ERRORS ..

DIAGNOSTIC WARNINGS ..

PLANT-REPORT VERIFICATION=(PV-A)

SUMMARY=(PS-B,BEPS)

HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..

PD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

PW\_OFF =WEEK-SCHEDULE (ALL) PD\_OFF ..

PW\_ON =WEEK-SCHEDULE (ALL) PD\_ON ..

## \$ HEATING SEASON

P\_HEAT =SCHEDULE THRU DEC 31 PW\_ON ..

## \$ COOLING SEASON

P\_COOL =SCHEDULE THRU MAY 15 PW\_OFF

THRU OCT 1 PW\_ON

THRU DEC 31 PW\_OFF ..

## \$ EQUIPMENT DESCRIPTION

BOILER-STM =PLANT-EQUIPMENT TYPE = STM-BOILER

SIZE = -999. ..

CHILLER-RC =PLANT-EQUIPMENT TYPE = HERM-REC-CHLR

SIZE = -999. INSTALLED-NUMBER = 2

MAX-NUMBER-AVAIL = 2 ..

PLANT-PARAMETERS BOILER-FUEL = NATURAL-GAS HERM-REC-COND-TYPE = AIR ..

ENERGY-RESOURCE RESOURCE = ELECTRICITY ..

ENERGY-RESOURCE RESOURCE = NATURAL-GAS ..

HEATINGSEA =LOAD-ASSIGNMENT TYPE = HEATING

OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000

PLANT-EQUIPMENT = BOILER-STM

NUMBER = 1 ..

COOLINGSEA =LOAD-ASSIGNMENT TYPE = COOLING

OPERATION-MODE = RUN-NEEDED



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LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = CHILLER-RC  
NUMBER = 2 ..

END ..  
COMPUTE PLANT ..  
STOP ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 16:32:13 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BUILDING 7245 KITCHEN AREA TOPEKA, KS  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT

NUMBER OF EXTERIOR SURFACES 7 RECTANGULAR 7 OTHER 0  
 (U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED )

| SURFACE    | SPACE | U-VALUE<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | WALLS<br>U-VALUE<br>(BTU/HR-SQFT-F) | WALLS<br>AREA<br>(SQFT) | GLASS<br>U-VALUE<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | GLASS+GLASS<br>U-VALUE<br>(BTU/HR-SQFT-F) | GLASS+GLASS<br>AREA<br>(SQFT) | GLASS+GLASS<br>U-VALUE<br>(BTU/HR-SQFT-F) | GLASS+GLASS<br>AREA<br>(SQFT) |
|------------|-------|----------------------------|-------------------------|-------------------------------------|-------------------------|-------------------------------------|-------------------------|---|-------------------------------|---|-------------------------------|
| KITCHEN    |       | 1.021                      | 42.40                   | 0.082                               | 371.00                  | 0.178                               | 413.40                  | 0.178                                     | 413.40                        | 0.178                                     | 413.40                        |
| KIT-MEZZIN |       | 0.000                      | 0.00                    | 0.082                               | 351.00                  | 0.082                               | 351.00                  | 0.082                                     | 351.00                        | 0.082                                     | 351.00                        |
| KIT-MEZZIN |       | 0.000                      | 0.00                    | 0.082                               | 776.70                  | 0.082                               | 776.70                  | 0.082                                     | 776.70                        | 0.082                                     | 776.70                        |
| KITCHEN    |       | 1.021                      | 115.20                  | 0.082                               | 799.58                  | 0.200                               | 914.78                  | 0.200                                     | 914.78                        | 0.200                                     | 914.78                        |
| KITCHEN    |       | 1.021                      | 16.00                   | 0.082                               | 397.40                  | 0.118                               | 413.40                  | 0.118                                     | 413.40                        | 0.118                                     | 413.40                        |
| KIT-MEZZIN |       | 0.000                      | 0.00                    | 0.082                               | 351.00                  | 0.082                               | 351.00                  | 0.082                                     | 351.00                        | 0.082                                     | 351.00                        |
| KIT-MEZZIN |       | 0.000                      | 0.00                    | 0.077                               | 3960.00                 | 0.077                               | 3960.00                 | 0.077                                     | 3960.00                       | 0.077                                     | 3960.00                       |
| KITCHEN    |       | 0.000                      | 0.00                    | 0.020                               | 3960.00                 | 0.020                               | 3960.00                 | 0.020                                     | 3960.00                       | 0.020                                     | 3960.00                       |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 16:32:13 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BUILDING 7245 KITCHEN AREA TOPEKA, KS  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT

| SURFACE     | SPACE | AVERAGE<br>U-VALUE/GLASS<br>(BTU/HR-SQFT-F) | AVERAGE<br>U-VALUE/WALLS<br>(BTU/HR-SQFT-F) | AVERAGE U-VALUE<br>WALLS+GLASS<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | OPAQUE<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) |
|-------------|-------|---|---|---|-------------------------|--------------------------|--------------------------------|
| SOUTH-EAST  |       | 1.021                                       | 0.082                                       | 0.134   | 42.40                   | 722.00                   | 764.40                         |
| SOUTH-WEST  |       | 1.021                                       | 0.082                                       | 0.146   | 115.20                  | 1576.28                  | 1691.48                        |
| NORTH-WEST  |       | 1.021                                       | 0.082                                       | 0.101   | 16.00                   | 748.40                   | 764.40                         |
| ROOF        |       | 0.000                                       | 0.077                                       | 0.077   | 0.00                    | 3960.00                  | 3960.00                        |
| ALL WALLS   |       | 1.021                                       | 0.082                                       | 0.132   | 173.60                  | 3046.68                  | 3220.28                        |
| WALLS+ROOFS |       | 1.021                                       | 0.079                                       | 0.102   | 173.60                  | 7006.68                  | 7180.28                        |
| UNDERGRND   |       | 0.000                                       | 0.020                                       | 0.020   | 0.00                    | 3960.00                  | 3960.00                        |
| BUILDING    |       | 1.021                                       | 0.058                                       | 0.073   | 173.60                  | 10966.68                 | 11140.28                       |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 16:32:13 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BUILDING 7245 KITCHEN AREA  
 REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS

\*\*\* BUILDING \*\*\*

FLOOR AREA 3954 SQFT 367 SQMT  
 VOLUME 41917 CUFT 1187 CUMT

HEATING LOAD  
 =====  
 JAN 28 4AM  
 OF -18C  
 -2F -19C

COOLING LOAD  
 =====  
 AUG 24 6PM  
 93F 34C  
 76F 24C

TIME  
 DRY-BULB TEMP  
 WET-BULB TEMP

|                      | SENSIBLE<br>(KBTU/H) ( KW ) |        | LATENT<br>(KBTU/H) ( KW ) |         |                                |
|----------------------|-----------------------------|--------|---------------------------|---------|--------------------------------|
| WALLS                | 1.904                       | 0.558  | 0.000                     | 0.000   | -8.554 -2.505                  |
| ROOFS                | 0.000                       | 0.000  | 0.000                     | 0.000   | 0.000 0.000                    |
| GLASS CONDUCTION     | 3.276                       | 0.960  | 0.000                     | 0.000   | -13.951 -4.086                 |
| GLASS SOLAR          | 14.150                      | 4.144  | 0.000                     | 0.000   | 0.282 0.082                    |
| DOOR                 | 0.019                       | 0.005  | 0.000                     | 0.000   | -0.040 -0.012                  |
| INTERNAL SURFACES    | 0.000                       | 0.000  | 0.000                     | 0.000   | 0.000 0.000                    |
| UNDERGROUND SURFACES | -0.375                      | -0.110 | 0.000                     | 0.000   | -2.274 -0.666                  |
| OCCUPANTS TO SPACE   | 7.218                       | 2.114  | 12.500                    | 3.661   | 0.771 0.226                    |
| LIGHT TO SPACE       | 8.504                       | 2.491  | 0.000                     | 0.000   | 3.254 0.953                    |
| EQUIPMENT TO SPACE   | 72.879                      | 21.344 | 0.000                     | 0.000   | 7.136 2.090                    |
| PROCESS TO SPACE     | 0.000                       | 0.000  | 0.000                     | 0.000   | 0.000 0.000                    |
| INFILTRATION         | 0.000                       | 0.000  | 0.000                     | 0.000   | 0.000 0.000                    |
| TOTAL                | 107.575                     | 31.506 | 12.500                    | 3.661   | -13.376 -3.918                 |
| TOTAL LOAD           | 120.075                     | KBTU/H | 35.167                    | KW      | -13.376 KBTU/H                 |
| TOTAL LOAD / AREA    | 30.37BTU/H.SQFT             |        | 95.725                    | W /SQMT | 3.383BTU/H.SQFT 10.664 W /SQMT |

\*\*\*\*\*  
 \*  
 \* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR  
 \*  
 \* LOADS  
 \* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION  
 \* IN CONSIDERATION  
 \*  
 \*  
 \*\*\*\*\*

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 16:32:13 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 BASELINE SIMULATION FOR BUILDING 7245 KITCHEN AREA TOPEKA, KS                 |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR KIT_H&VS   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----                                    |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN  | 0.00000                     |                         |                      |                      | -122.144                    | 16                      | 10                   | 19.F                 | -294.581                                | 21944.                             | 43.289                          |
| FEB  | 0.00000                     |                         |                      |                      | -96.293                     | 3                       | 11                   | 16.F                 | -277.715                                | 19821.                             | 43.289                          |
| MAR  | 0.00000                     |                         |                      |                      | -74.915                     | 3                       | 4                    | 16.F                 | -246.204                                | 21944.                             | 43.289                          |
| APR  | 0.00000                     |                         |                      |                      | -24.267                     | 5                       | 4                    | 32.F                 | -165.388                                | 21236.                             | 43.289                          |
| MAY  | 0.00000                     |                         |                      |                      | -7.285                      | 1                       | 4                    | 39.F                 | -116.566                                | 21944.                             | 43.289                          |
| JUN  | 0.00000                     |                         |                      |                      | -2.499                      | 23                      | 4                    | 67.F                 | -75.891                                 | 21236.                             | 43.289                          |
| JUL  | 0.00000                     |                         |                      |                      | -1.333                      | 4                       | 4                    | 68.F                 | -59.244                                 | 21944.                             | 43.289                          |
| AUG  | 0.00000                     |                         |                      |                      | -0.844                      | 26                      | 10                   | 69.F                 | -42.436                                 | 21944.                             | 43.289                          |
| SEP  | 0.00000                     |                         |                      |                      | -8.166                      | 11                      | 4                    | 43.F                 | -91.949                                 | 21236.                             | 43.289                          |
| OCT  | 0.00000                     |                         |                      |                      | -20.983                     | 20                      | 4                    | 25.F                 | -197.680                                | 21944.                             | 43.289                          |
| NOV  | 0.00000                     |                         |                      |                      | -60.738                     | 2                       | 4                    | 17.F                 | -240.878                                | 21236.                             | 43.289                          |
| DEC  | 0.00000                     |                         |                      |                      | -113.182                    | 15                      | 9                    | 16.F                 | -273.544                                | 21944.                             | 43.289                          |
| TOTAL  | 0.000                       |                         |                      |                      | -532.649                    |                         |                      |                      | -294.581                                | 258360.                            | 43.289                          |
| MAX  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |

| -----                     |  |  |  |            |  |              |  |            |  |                    |  |
|---------------------------|--|--|--|------------|--|--------------|--|------------|--|--------------------|--|
| EMC ENGINEERS INC.        |  | EZDOE - ELITE SOFTWARE DEVELOPMENT INC |  |            |  | DOE-2.1D     |  | 5/12/1995  |  | 16:32:13 SDL RUN 1 |  |
| DENVER, CO 80227          |  | BASELINE SIMULATION FOR BUILDING 7245  |  |            |  | KITCHEN AREA |  |            |  |                    |  |
| REPORT- SS-C              |  | SYSTEM MONTHLY LOAD HOURS FOR KIT H&VS |  |            |  | TOPEKA, KS   |  |            |  |                    |  |
| -----                     |  |  |  |            |  |              |  |            |  |                    |  |
| N U M B E R O F H O U R S |  |  |  |            |  |              |  |            |  |                    |  |
| -----                     |  |  |  |            |  |              |  |            |  |                    |  |
| HOURS                     |  | HOURS                                  |  | HOURS      |  | HOURS        |  | HOURS      |  | HOURS              |  |
| COINCIDENT                |  | COINCIDENT                             |  | COINCIDENT |  | COINCIDENT   |  | COINCIDENT |  | COINCIDENT         |  |
| COOL-HEAT                 |  | COOL-HEAT                              |  | COOL-HEAT  |  | COOL-HEAT    |  | COOL-HEAT  |  | COOL-HEAT          |  |
| LOAD                      |  | LOAD                                   |  | LOAD       |  | LOAD         |  | LOAD       |  | LOAD               |  |
| HEATING                   |  | HEATING                                |  | HEATING    |  | HEATING      |  | HEATING    |  | HEATING            |  |
| LOAD                      |  | LOAD                                   |  | LOAD       |  | LOAD         |  | LOAD       |  | LOAD               |  |
| COOLING                   |  | COOLING                                |  | COOLING    |  | COOLING      |  | COOLING    |  | COOLING            |  |
| LOAD                      |  | LOAD                                   |  | LOAD       |  | LOAD         |  | LOAD       |  | LOAD               |  |
| MONTH                     |  | MONTH                                  |  | MONTH      |  | MONTH        |  | MONTH      |  | MONTH              |  |
| JAN                       |  | JAN                                    |  | JAN        |  | JAN          |  | JAN        |  | JAN                |  |
| FEB                       |  | FEB                                    |  | FEB        |  | FEB          |  | FEB        |  | FEB                |  |
| MAR                       |  | MAR                                    |  | MAR        |  | MAR          |  | MAR        |  | MAR                |  |
| APR                       |  | APR                                    |  | APR        |  | APR          |  | APR        |  | APR                |  |
| MAY                       |  | MAY                                    |  | MAY        |  | MAY          |  | MAY        |  | MAY                |  |
| JUN                       |  | JUN                                    |  | JUN        |  | JUN          |  | JUN        |  | JUN                |  |
| JUL                       |  | JUL                                    |  | JUL        |  | JUL          |  | JUL        |  | JUL                |  |
| AUG                       |  | AUG                                    |  | AUG        |  | AUG          |  | AUG        |  | AUG                |  |
| SEP                       |  | SEP                                    |  | SEP        |  | SEP          |  | SEP        |  | SEP                |  |
| OCT                       |  | OCT                                    |  | OCT        |  | OCT          |  | OCT        |  | OCT                |  |
| NOV                       |  | NOV                                    |  | NOV        |  | NOV          |  | NOV        |  | NOV                |  |
| DEC                       |  | DEC                                    |  | DEC        |  | DEC          |  | DEC        |  | DEC                |  |
| ANNUAL                    |  | ANNUAL                                 |  | ANNUAL     |  | ANNUAL       |  | ANNUAL     |  | ANNUAL             |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 4940                      |  | 4940                                   |  | 4940       |  | 4940         |  | 4940       |  | 4940               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 3820                      |  | 3820                                   |  | 3820       |  | 3820         |  | 3820       |  | 3820               |  |
| 0                         |  | 0                                      |  | 0          |  | 0            |  | 0          |  | 0                  |  |
| 8760                      |  | 8760                                   |  | 8760       |  | 8760         |  | 8760       |  | 8760               |  |
| 0                         |  | 0                                      |  | 0          |  |              |  |            |  |                    |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 16:32:13 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BUILDING 7245 KITCHEN AREA  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>79.674<br>154.352<br>31/18 | NATURAL-GAS<br>176.135<br>386.785<br>16/10 |
|-----|--|---|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 71.862<br>154.352<br>28/12                | 142.049<br>368.311<br>3/11                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 78.796<br>154.352<br>31/12                | 114.596<br>333.269<br>3/ 4                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 74.286<br>154.352<br>24/ 7                | 40.820<br>240.247<br>5/ 4                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 75.600<br>154.352<br>6/ 5                 | 13.342<br>181.858<br>1/ 4                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 72.756<br>151.106<br>2/ 5                 | 4.769<br>131.949<br>23/ 4                  |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 75.058<br>150.371<br>28/ 5                | 2.525<br>105.691<br>4/ 4                   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 75.013<br>150.392<br>27/ 5                | 1.665<br>77.127<br>26/10                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 73.280<br>154.352<br>11/ 7                | 15.001<br>151.789<br>11/ 4                 |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 76.663<br>154.352<br>27/ 7                | 36.615<br>277.960<br>20/ 4                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 75.797<br>154.352<br>30/18                | 93.941<br>327.277<br>2/ 4                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 79.562<br>154.352<br>31/18                | 164.888<br>363.713<br>15/ 9                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |   |  |
|     | ONE YEAR<br>USE/PEAK                             | 908.349<br>154.352                        | 806.346<br>386.785                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 16:32:13 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BUILDING 7245 KITCHEN AREA TOPEKA, KS  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 26.15       | 806.35      |
| SPACE COOL      | 0.00        | 0.00        |
| HVAC AUX        | 367.52      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 65.32       | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 449.40      | 0.00        |
| TOTAL           | 908.39      | 806.35      |

TOTAL SITE ENERGY 1714.69 MBTU 433.0 KBTU/SQFT-YR GROSS-AREA 433.6 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 3534.12 MBTU 892.5 KBTU/SQFT-YR GROSS-AREA 893.7 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 3.3  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



```

KIT-MEZZIN =SPACE      AREA = 3954.4  VOLUME = 35589.6
                        TEMPERATURE = (73.)  ZONE-TYPE = UNCONDITIONED
                        PEOPLE-HG-LAT = 625.0  PEOPLE-HG-SENS = 375.0
                        LIGHTING-TYPE = SUS-FLUOR  LIGHT-TO-SPACE = 1.0
                        EQUIP-SCHEDULE = L_ON  EQUIPMENT-KW = 3.68
                        FURN-WEIGHT = 0.8  INF-METHOD = NONE  ..

```

```

E-W      HEIGHT = 9.0  WIDTH = 86.3  CONS = EXWALL-1
          AZIMUTH = 225  SKY-FORM-FACTOR = 0.5
          GND-FORM-FACTOR = 0.5  ..

```

```

E-W      HEIGHT = 9.0  WIDTH = 39.0  CONS = EXWALL-1
          AZIMUTH = 135  SKY-FORM-FACTOR = 0.5
          GND-FORM-FACTOR = 0.5  ..

```

```

E-W      HEIGHT = 9.0  WIDTH = 39.0  CONS = EXWALL-1
          AZIMUTH = 315  SKY-FORM-FACTOR = 0.5
          GND-FORM-FACTOR = 0.5  ..

```

```

ROOF     HEIGHT = 60.0  WIDTH = 66.0  CONS = ROOF-1
          TILT = 0  SKY-FORM-FACTOR = 1.0  ..

```

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

#### \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

```

LINE-4 \*RUN #2 DDC CONTROL FOR BULIDING 7245 \*

LINE-5 \*KITCHEN AREA \* ..

ABORT ERRORS ..

DIAGNOSTIC WARNINGS ..

SYSTEMS-REPORT VERIFICATION=(SV-A)

SUMMARY=(SS-A,SS-C,SS-K,SS-O)

HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..

SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

SD\_W\_HT\_F =DAY-SCHEDULE (1,24) (70.) ..

SD\_S\_CL\_F =DAY-SCHEDULE (1,24) (76.) ..

SD\_EXHAUST =DAY-SCHEDULE (1,4) (0.)

(5,24) (1.) ..





```
SD_W_CL_F =DAY-SCHEDULE (1,24) (72.) ..
SD_S_HT_F =DAY-SCHEDULE (1,24) (74.) ..
```

```
SW_ON      =WEEK-SCHEDULE (ALL) SD_ON  ..
```

```
SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..
```

```
SW_W_HT_F =WEEK-SCHEDULE (ALL) SD_W_HT_F ..
```

```
SW_S_CL_F =WEEK-SCHEDULE (ALL) SD_S_CL_F ..
```

```
SW_EXHAUST =WEEK-SCHEDULE (ALL) SD_EXHAUST ..
```

```
SW_W_CL_F =WEEK-SCHEDULE (ALL) SD_W_CL_F ..
```

```
SW_S_HT_F =WEEK-SCHEDULE (ALL) SD_S_HT_F ..
```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON  ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..
```

## \$ HEATING SEASON

```
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON  ..
```

## \$ COOLING SEASON

```
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF  ..
```

## \$ HEATING SET TEMP

```
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_W_HT_F
              THRU OCT  1 SW_S_HT_F
              THRU DEC 31 SW_W_HT_F  ..
```

## \$ COOLING SET TEMP

```
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_W_CL_F
              THRU OCT  1 SW_S_CL_F
              THRU DEC 31 SW_W_CL_F  ..
```

## \$ SCHEDULE OF EXHAUST

```
S_EXHAUST =SCHEDULE THRU DEC 31 SW_EXHAUST ..
```

```
S_HRLY-RPS =SCHEDULE THRU JAN 15 SW_OFF
```

```
              THRU JAN 16 SW_ON
```

```
              THRU AUG 26 SW_OFF
```

```
              THRU AUG 27 SW_ON
```

```
              THRU DEC 31 SW_OFF  ..
```

## \$ ZONE DESCRIPTION

KITCHEN =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 BASEBOARD-CTRL = THERMOSTATIC  
 BASEBOARD-RATING = -35500. SIZING-OPTION = FROM-LOADS ..

KIT-MEZZIN =ZONE DESIGN-HEAT-T = 67.0 DESIGN-COOL-T = 82.0  
 ZONE-TYPE = UNCONDITIONED SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

KIT\_H&VS =SYSTEM SYSTEM-TYPE = HVSYS  
 MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S\_ON  
 OA-CONTROL = FIXED SUPPLY-CFM = 15000.  
 RETURN-CFM = 15000. RATED-CFM = 15000.  
 MIN-OUTSIDE-AIR = 1.0 MIN-AIR-SCH = S\_ON  
 RECOVERY-EFF = 0.7 FAN-SCHEDULE = S\_ON  
 SUPPLY-DELTA-T = 2.4 SUPPLY-KW = 0.00078  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF RETURN-STATIC = 0.25  
 RETURN-EFF = 0.75 NIGHT-VENT-DT = 0.0  
 HEATING-CAPACITY = -900000.  
 ZONE-NAMES = (KITCHEN, KIT-MEZZIN) ..

## \$ HOURLY REPORT DESCRIPTION

ZONE-BLOCK =REPORT-BLOCK VARIABLE-TYPE = KITCHEN  
 VARIABLE-LIST = (17,18,7,31,15,11,14) ..  
 AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = KIT\_H&VS  
 VARIABLE-LIST = (3,5,6,17) ..  
 ZONE-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPS  
 REPORT-BLOCK = (ZONE-BLOCK)  
 ..  
 AHU-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPS  
 REPORT-BLOCK = (AHU-BLOCK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..

INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 16:41: 0 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BUILDING 7245 KITCHEN AREA  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR KIT\_H&VS TOPEKA, KS

| MONTH | COOLING                     |                         |                      |                      | HEATING                     |                         |                      |                      | ELECTRIC                                |   |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -121.405                    | 15                      | 4                    | -8.F                 | 0.000                                   | -283.439                                | 21944.                             | 43.289                          |
| FEB   | 0.00000                     |                         |                      |                      | -95.881                     | 3                       | 10                   | 10.F                 | 0.000                                   | -260.050                                | 19821.                             | 43.289                          |
| MAR   | 0.00000                     |                         |                      |                      | -74.701                     | 3                       | 10                   | 19.F                 | 0.000                                   | -235.816                                | 21944.                             | 43.289                          |
| APR   | 0.00000                     |                         |                      |                      | -24.263                     | 5                       | 4                    | 32.F                 | 0.000                                   | -162.644                                | 21236.                             | 43.289                          |
| MAY   | 0.00000                     |                         |                      |                      | -7.285                      | 1                       | 4                    | 39.F                 | 0.000                                   | -116.566                                | 21944.                             | 43.289                          |
| JUN   | 0.00000                     |                         |                      |                      | -2.499                      | 23                      | 4                    | 67.F                 | 0.000                                   | -75.891                                 | 21236.                             | 43.289                          |
| JUL   | 0.00000                     |                         |                      |                      | -1.333                      | 4                       | 4                    | 68.F                 | 0.000                                   | -59.244                                 | 21944.                             | 43.289                          |
| AUG   | 0.00000                     |                         |                      |                      | -0.844                      | 26                      | 10                   | 69.F                 | 0.000                                   | -42.436                                 | 21944.                             | 43.289                          |
| SEP   | 0.00000                     |                         |                      |                      | -8.166                      | 11                      | 4                    | 43.F                 | 0.000                                   | -91.949                                 | 21236.                             | 43.289                          |
| OCT   | 0.00000                     |                         |                      |                      | -20.986                     | 20                      | 4                    | 25.F                 | 0.000                                   | -196.660                                | 21944.                             | 43.289                          |
| NOV   | 0.00000                     |                         |                      |                      | -60.668                     | 10                      | 4                    | 18.F                 | 0.000                                   | -235.831                                | 21236.                             | 43.289                          |
| DEC   | 0.00000                     |                         |                      |                      | -112.579                    | 15                      | 10                   | 20.F                 | 0.000                                   | -260.707                                | 21944.                             | 43.289                          |
| TOTAL | 0.000                       |                         |                      |                      | -530.608                    |                         |                      |                      | 0.000                                   | -283.439                                | 258360.                            | 43.289                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |   |                                    |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 16:41: 0 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BUILDING 7245 KITCHEN AREA  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR KIT\_H&VS TOPEKA, KS

| MONTH  | COOLING                  |                          |                            |                   | HEATING                    |                            |                           |                           | ELECTRIC                             |  |  |                                 |
|--------|--------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|---------------------------|---------------------------|--------------------------------------|--|--|---------------------------------|
|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN    | 0                        | 744                      | 0                          | 0                 | 744                        | 0                          | 0                         | 0                         | 0                                    | -153.076   | 23.485   | 23.485                          |
| FEB    | 0                        | 669                      | 0                          | 3                 | 672                        | 0                          | 0                         | 0                         | 3                                    | -156.663   | 23.485   | 23.485                          |
| MAR    | 0                        | 689                      | 0                          | 55                | 744                        | 0                          | 0                         | 0                         | 55                                   | -149.267   | 23.485   | 23.485                          |
| APR    | 0                        | 419                      | 0                          | 301               | 720                        | 0                          | 0                         | 0                         | 301                                  | -58.487  | 16.222   | 16.222                          |
| MAY    | 0                        | 218                      | 0                          | 526               | 744                        | 0                          | 0                         | 0                         | 526                                  | 0.000  | 16.222   | 16.222                          |
| JUN    | 0                        | 105                      | 0                          | 615               | 720                        | 0                          | 0                         | 0                         | 615                                  | 0.000  | 16.222   | 16.222                          |
| JUL    | 0                        | 52                       | 0                          | 692               | 744                        | 0                          | 0                         | 0                         | 692                                  | -26.091  | 16.222   | 16.222                          |
| AUG    | 0                        | 46                       | 0                          | 698               | 744                        | 0                          | 0                         | 0                         | 698                                  | 0.000  | 16.222   | 16.222                          |
| SEP    | 0                        | 233                      | 0                          | 487               | 720                        | 0                          | 0                         | 0                         | 487                                  | -68.662  | 16.222   | 16.222                          |
| OCT    | 0                        | 430                      | 0                          | 314               | 744                        | 0                          | 0                         | 0                         | 314                                  | -97.486  | 23.485   | 23.485                          |
| NOV    | 0                        | 591                      | 0                          | 129               | 720                        | 0                          | 0                         | 0                         | 129                                  | -183.738   | 23.485   | 23.485                          |
| DEC    | 0                        | 744                      | 0                          | 0                 | 744                        | 0                          | 0                         | 0                         | 0                                    | -176.631   | 23.485   | 23.485                          |
| ANNUAL | 0                        | 4940                     | 0                          | 3820              | 8760                       | 0                          | 8760                      | 0                         | 3820                                 |  |  |                                 |

EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 16:41: 0 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #2 DDC CONTROL FOR BUILDING 7245 KITCHEN AREA TOPEKA, KS  
 REPORT- PS-B

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>79.507<br>154.104<br>31/18 | NATURAL-GAS<br>174.077<br>372.156<br>15/ 4 |
|-----|--|---|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 71.712<br>154.104<br>3/10                 | 140.549<br>346.477<br>3/10                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 78.681<br>154.104<br>31/12                | 113.557<br>319.455<br>3/ 2                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 74.247<br>154.104<br>24/ 7                | 40.544<br>235.296<br>5/ 4                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 75.592<br>154.104<br>7/ 5                 | 13.269<br>180.320<br>1/ 4                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 72.755<br>151.096<br>2/ 5                 | 4.747<br>130.518<br>23/ 4                  |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 75.057<br>150.361<br>28/ 5                | 2.515<br>105.502<br>4/ 4                   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 75.013<br>150.382<br>27/ 5                | 1.656<br>76.938<br>26/10                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 73.274<br>154.104<br>11/ 7                | 14.937<br>150.321<br>11/ 4                 |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 76.633<br>154.104<br>31/ 7                | 36.398<br>274.899<br>20/ 4                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 75.702<br>154.104<br>30/18                | 93.211<br>319.472<br>10/ 4                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 79.401<br>154.104<br>31/18                | 163.047<br>347.204<br>15/10                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |   |  |
|     | ONE YEAR<br>USE/PEAK                             | 907.574<br>154.104                        | 798.506<br>372.156                         |

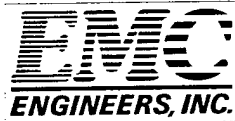
EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/12/1995 16:41: 0 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BUILDING 7245 KITCHEN AREA  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 25.37       | 798.51      |
| SPACE COOL      | 0.00        | 0.00        |
| HVAC AUX        | 367.53      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 65.32       | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 449.40      | 0.00        |
| TOTAL           | 907.62      | 798.51      |

TOTAL SITE ENERGY 1706.08 MBTU 430.8 KBTU/SQFT-YR GROSS-AREA 431.4 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 3523.95 MBTU 889.9 KBTU/SQFT-YR GROSS-AREA 891.1 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 2.1  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

**COMPUTER ENERGY SIMULATIONS**

**BLDG. 8300A/B  
MAINTENANCE BUILDINGS**



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

BUILDING NO.:  
BLDG. TYPE:

8300  
VEH MAINT SHOP (MAINT BAY DOORS CLOSED)

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

### ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1   | RUN2   | RUN3 | RUN4 | RUN5 |
|----------------|---------|--------|--------|------|------|------|
| HEATING (MBtu) | 668.9   | 413.4  | 558.9  | 0.0  | 0.0  | 0.0  |
| COOLING (kWH)  | 57,814  | 54,726 | 55,508 | 0    | 0    | 0    |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 4,992 CFM                         |
| FLOOR AREA     | 10,475 FT <sup>2</sup>            |
| CFMI           | 349 CFM                           |
| UA             | 2709 BTU/HR-°F                    |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

#### EZDOE COMPUTER RUN DEFINITION:

|         |                             |
|---------|-----------------------------|
| BASERUN | EXISTING OPERATION          |
| RUN1    | NIGHT SETBACK               |
| RUN2    | DDC CONTROL                 |
| RUN3    | ECONOMIZER                  |
| RUN4    | NIGHTTIME INFILTRATION (OA) |
| RUN5    | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      |            | ANNUAL HEATING & COOLING HOURS |            |
|--------------------|-------------------|------|------------|--------------------------------|------------|
| M-F                | 700               | 1800 | 55 HR      | HR. ON HEATING                 | 1784 HR/YR |
| SAT.               | 0                 | 0    | 0 HR       | HR. ON COOLING                 | 1084 HR/YR |
| SUN.               | 0                 | 0    | 0 HR       | HR. OFF HEATING                | 3664 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 55 HR/WK   | HR. OFF COOLING                | 2228 HR/YR |
|                    | TOTAL UNOCC. HR.  |      | 113 HR/WK  |                                |            |
|                    | ANNUAL OCCUPY HR. |      | 2868 HR/YR |                                |            |
|                    | ANNUAL UNOCC. HR. |      | 5892 HR/YR |                                |            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

8760 HR/YR  
5448 HR/YR  
3312 HR/YR

HRS SAVED (HTG ONLY) 5448 - 1784 = 3664 HR/YR  
HRS SAVED (CLG ONLY) 3312 - 1084 = 2228 HR/YR

|           |   |   |              |   |                     |
|-----------|---|---|--------------|---|---------------------|
| HOAUHC    | 668.91 MBtu   | - | 0 MBtu       | = | 0.00E+00 Btu/CFM-HR |
|           | 349.44 CFM  | x | 5892 HR/YR   |   |                     |
| HOAUH     | 668.91 MBtu   | - | 0 MBtu       | = | 0.00E+00 Btu/CFM-HR |
|           | 349.44 CFM  | x | 3664 HR/YR   |   |                     |
| COAUHC    | 57,814.2 kWH  | - | 0.0 kWH      | = | 0.00E+00 kWH/CFM-HR |
|           | 349.44 CFM  | x | 5892 HR/YR   |   |                     |
| COAUC     | 57,814.2 kWH  | - | 0.0 kWH      | = | 0.00E+00 kWH/CFM-HR |
|           | 349.44 CFM  | x | 2228 HR/YR   |   |                     |
| HOAOHC    | 668.91 MBtu   | - | 0 MBtu       | = | 0.00E+00 Btu/CFM-HR |
|           | 349.44 CFM  | x | 2868 HR/YR   |   |                     |
| HOAOH     | 668.91 MBtu   | - | 0 MBtu       | = | 0.00E+00 Btu/CFM-HR |
|           | 349.44 CFM  | x | 1784 HR/YR   |   |                     |
| COAOHC    | 57,814.2 kWH  | - | 0.0 kWH      | = | 0.00E+00 kWH/CFM-HR |
|           | 349.44 CFM  | x | 2868 HR/YR   |   |                     |
| COAOC     | 57,814.2 kWH  | - | 0.0 kWH      | = | 0.00E+00 kWH/CFM-HR |
|           | 349.44 CFM  | x | 1084 HR/YR   |   |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |              | = | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |              | = | 0.17                |
| ECC       | 54,726.0 kWH  | - | 0.0 kWH      | = | 0.00E+00 kWH/CFM-HR |
|           | 4992 CFM  | x | 1084 HR/YR   |   |                     |
| ECHC      | 54,726.0 kWH  | - | 0.0 kWH      | = | 0.00E+00 kWH/CFM-HR |
|           | 4992 CFM  | x | 2868 HR/YR   |   |                     |
| NSUCHC    | 57,814.2 kWH  | - | 54,726.0 kWH | = | 1.05E-04 kWH/CFM-HR |
|           | 4992 CFM  | x | 5892 HR/YR   |   |                     |
| NSUCC     | 57,814.2 kWH  | - | 54,726.0 kWH | = | 2.78E-04 kWH/CFM-HR |
|           | 4992 CFM  | x | 2228 HR/YR   |   |                     |
| DDCCHC    | 57,814.2 kWH  | - | 55,508.4 kWH | = | 1.61E-04 kWH/CFM-HR |
|           | 4992 CFM  | x | 2868 HR/YR   |   |                     |
| DDCCC     | 57,814.2 kWH  | - | 55,508.4 kWH | = | 4.26E-04 kWH/CFM-HR |
|           | 4992 CFM  | x | 1084 HR/YR   |   |                     |
| NSC       | 668.91 MBtu   | - | 413.44 MBtu  | = | 9.43E+04 Btu/UA     |
|           | 2709 UA   |   |              |   |                     |
| DDCH      | 668.91 MBtu   | - | 558.86 MBtu  | = | 4.06E+04 Btu/UA     |
|           | 2709 UA   |   |              |   |                     |
| OPT       | (2 HR/DAY X 240 DAY/YR)                               | - | 175 HR/YR    | = | 305 HR/YR           |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |              | = | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01         | = | 5.67 HR/YR          |





INPUT LOADS ..

```

$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BLDG. #8300      *
        LINE-5 *VEHICAL MAINT W/ DOORS CLOSED IN BAY      * ..

```

```

ABORT          ERRORS ..
DIAGNOSTIC     WARNINGS ..
LOADS-REPORT   VERIFICATION=(LV-D)
               SUMMARY=(LS-C,LS-D)
               HOURLY-DATA-SAVE = YES ..
BUILDING-LOCATION LATITUDE = 39.0
                LONGITUDE = 96.5
                ALTITUDE = 1065.
                TIME-ZONE = 6
                GROSS-AREA = 10475
                SHIELDING-COEF = 0.29
                X-REF = 0.0
                Y-REF = 0.0 ..
RUN-PERIOD     JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

LD\_ON =DAY-SCHEDULE (1,24) (1.) ..

LD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

```

LD_PEOPLE =DAY-SCHEDULE (1,6) (0.)
              (7) (0.5)
              (8,11) (1.)
              (12) (0.5)
              (13,16) (1.)
              (17) (0.5)
              (18,24) (0.) ..

```

```

LW_PEOPLE =WEEK-SCHEDULE (WD) LD_PEOPLE
              (WEH) LD_OFF ..

```

LW\_ON =WEEK-SCHEDULE (ALL) LD\_ON ..

LW\_OFF =WEEK-SCHEDULE (ALL) LD\_OFF ..

\$ ON 100% OF THE TIME

L\_ON =SCHEDULE THRU DEC 31 LW\_ON ..

\$ OFF 100% OF THE TIME

L\_OFF =SCHEDULE THRU DEC 31 LW\_OFF ..

\$ PEOPLE LOAD M-F7.5-17.5

L\_PEOPLE =SCHEDULE THRU DEC 31 LW\_PEOPLE ..

#### \$ CONSTRUCTION TYPES

##### \$ EXTERIOR WALL U-VALUE FROM PLANS

EXWALL-1 =CONSTRUCTION U-VALUE = 0.137  
 ABSORPTANCE = 0.880  
 ROUGHNESS = 2 ..

FLOOR =CONSTRUCTION U-VALUE = 0.020  
 ABSORPTANCE = 0.610  
 ROUGHNESS = 5 ..

##### \$ BUILT-UP ROOF U-VALUE FROM PLANS

ROOF-1 =CONSTRUCTION U-VALUE = 0.094  
 ABSORPTANCE = 0.800  
 ROUGHNESS = 1 ..

##### \$ STANDARD METAL DOOR

DOOR-STD =LAYERS MATERIAL=(HF-A3,IN22,HF-A3) I-F-R= 0.6100  
 THICKNESS=(0.005,0.083,0.005) ..

DOOR-MET =CONSTRUCTION LAYERS = DOOR-STD  
 ABSORPTANCE = 0.850  
 ROUGHNESS = 5 ..

##### \$ EXTER OFFICE WALL U-VAL FROM PLAN

EXWALL-2 =CONSTRUCTION U-VALUE = 0.094  
 ABSORPTANCE = 0.880  
 ROUGHNESS = 2 ..

2\_PN\_STD =GLASS-TYPE GLASS-TYPE-CODE = 2  
 PANES = 2 ..

#### \$ SPACE DESCRIPTION

BAY-AREA =SPACE AREA = 8640.0 VOLUME = 216000.0  
 TEMPERATURE = (69.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 28.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = INCAND LIGHTING-W/SQFT = 1.65  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_PEOPLE  
 SOURCE-SENSIBLE = 0.0 FLOOR-WEIGHT = 130.

INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.24  
 INF-SCHEDULE = L\_ON ..

E-W HEIGHT = 25.0 WIDTH = 144.0 CONS = EXWALL-1  
 AZIMUTH = 45 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 16.0 WIDTH = 16.0 CONS = DOOR-MET  
 MULTIPLIER = 6.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 25.0 WIDTH = 144.0 CONS = EXWALL-1  
 AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 16.0 WIDTH = 16.0 CONS = DOOR-MET  
 MULTIPLIER = 5.0 SETBACK = 0.5  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 2.8 WIDTH = 5.0 G-T = 2\_PN\_STD  
 MULTIPLIER = 4.0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 25.0 WIDTH = 60.0 CONS = EXWALL-1  
 AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 2.8 WIDTH = 5.0 G-T = 2\_PN\_STD  
 MULTIPLIER = 19.0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 60.0 WIDTH = 124.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

U-W HEIGHT = 60.0 WIDTH = 124.0 CONS = FLOOR ..

OFFICE-ARE =SPACE AREA = 1835.0 VOLUME = 45875.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 12.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.91  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_PEOPLE  
 EQUIP-SCHEDULE = L\_PEOPLE EQUIPMENT-W/SQFT = 0.73  
 SOURCE-SENSIBLE = 0.0 FLOOR-WEIGHT = 130.  
 FURN-WEIGHT = 1. INF-METHOD = AIR-CHANGE  
 AIR-CHANGES/HR = 0.13 INF-SCHEDULE = L\_ON ..

E-W HEIGHT = 25.0 WIDTH = 54.0 CONS = EXWALL-2  
 AZIMUTH = 135 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 2.8 WIDTH = 5.0 G-T = 2\_PN\_STD  
 MULTIPLIER = 10.0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 25.0 WIDTH = 20.0 CONS = EXWALL-2  
 AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 2.8 WIDTH = 5.0 G-T = 2\_PN\_STD  
 MULTIPLIER = 3.0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 5.0 WIDTH = 607.0 CONS = FLOOR ..

ROOF HEIGHT = 5.0 WIDTH = 607.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*BASELINE SIMULATION FOR BLDG. #8300 \*  
 LINE-5 \*VEHICAL MAINT W/ DOORS CLOSED IN BAY \* ..  
 ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_WT-VENT =DAY-SCHEDULE (1,24) (0.5) ..  
 SD\_HT\_69F =DAY-SCHEDULE (1,24) (69.) ..  
 SD\_FORCOFF =DAY-SCHEDULE (1,24) (-1.) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,24) (76.) ..  
 SD\_SM\_HT =DAY-SCHEDULE (1,24) (70.) ..  
 SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..  
 SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..  
 SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..  
SW\_WT-VENT =WEEK-SCHEDULE (ALL) SD\_WT-VENT ..  
SW\_HT\_69F =WEEK-SCHEDULE (ALL) SD\_HT\_69F ..  
SW\_FORCOFF =WEEK-SCHEDULE (ALL) SD\_FORCOFF ..  
SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..  
SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..

## \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
THRU OCT 1 SW\_OFF  
THRU DEC 31 SW\_ON ..

## \$ FORCE FAN OFF DUR SUMM

S\_CL\_FANOF =SCHEDULE THRU MAY 15 SW\_OFF  
THRU OCT 1 SW\_FORCOFF  
THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

## \$ 50%OA IN WT-100% IN SUM

S\_VENT\_SCH =SCHEDULE THRU MAY 15 SW\_WT-VENT  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_WT-VENT ..

## \$ HEATING SET TEMP =69F

S\_HT\_F\_69 =SCHEDULE THRU DEC 31 SW\_HT\_69F ..

S\_HRLY-RPS =SCHEDULE THRU JAN 1 SW\_OFF  
THRU JAN 2 SW\_ON  
THRU JAN 3 SW\_OFF  
THRU JAN 4 SW\_ON  
THRU AUG 6 SW\_OFF  
THRU AUG 8 SW\_ON  
THRU DEC 31 SW\_OFF ..

## \$ ZONE DESCRIPTION

```

BAY-AREA  =ZONE  DESIGN-HEAT-T = 69.0  DESIGN-COOL-T = 72.0
                HEAT-TEMP-SCH = S_HT_F_69  COOL-TEMP-SCH = S_CL_SET_F
                ZONE-TYPE = CONDITIONED
                THERMOSTAT-TYPE = PROPORTIONAL
                SIZING-OPTION = FROM-LOADS  ..

OFFICE-ARE =ZONE  DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
                HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
                ZONE-TYPE = CONDITIONED
                THERMOSTAT-TYPE = PROPORTIONAL
                SIZING-OPTION = FROM-LOADS  ..

```

## \$ SYSTEM DESCRIPTION

```

SIM-IR-HET =SYSTEM  SYSTEM-TYPE = FPH
                  HEATING-SCHEDULE = S_ON
                  ZONE-NAMES = (BAY-AREA)  ..

RES-FURNCE =SYSTEM  SYSTEM-TYPE = PSZ
                  MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
                  HEATING-SCHEDULE = S_ON  COOLING-SCHEDULE = S_OFF
                  OA-CONTROL = FIXED  SUPPLY-CFM = 4800.
                  RATED-CFM = 4800.  MIN-OUTSIDE-AIR = 0.07
                  MAX-OA-FRACTION = 0.07  FAN-SCHEDULE = S_CL_FANOF
                  SUPPLY-DELTA-T = 1.8  SUPPLY-KW = 0.00059
                  FAN-PLACEMENT = BLOW-THROUGH
                  NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  NIGHT-VENT-DT = 0.0
                  COOL-FT-MIN = 0.  HEATING-CAPACITY = -300000.
                  MIN-HP-T = 0.  MAX-HP-SUPP-T = 0.  DEFROST-T = 0.
                  CRANKCASE-MAX-T = 65.  OUTSIDE-FAN-T = 45.
                  SIZING-OPTION = COINCIDENT
                  ZONE-NAMES = (OFFICE-ARE)  ..

```

## \$ HOURLY REPORT DESCRIPTION

```

BAY-ZN-BLK =REPORT-BLOCK  VARIABLE-TYPE = BAY-AREA
                  VARIABLE-LIST = (17,18,7,6)  ..
OFFIC-BLK  =REPORT-BLOCK  VARIABLE-TYPE = OFFICE-ARE
                  VARIABLE-LIST = (17,18,7,6)  ..
IRHEAT-BLK =REPORT-BLOCK  VARIABLE-TYPE = SIM-IR-HET
                  VARIABLE-LIST = (3,5,7)  ..
R-FURN-BLK =REPORT-BLOCK  VARIABLE-TYPE = RES-FURNCE
                  VARIABLE-LIST = (3,5,6,17)  ..
SYSTM-HRLY = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPS
                  REPORT-BLOCK = (IRHEAT-BLK,R-FURN-BLK)
..
ZONES-HRLY = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPS
                  REPORT-BLOCK = (BAY-ZN-BLK,OFFIC-BLK)
..
END  ..
COMPUTE SYSTEMS  ..

```

INPUT PLANT ..

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BLDG. #8300      *
        LINE-5 *VEHICAL MAINT W/ DOORS CLOSED IN BAY      * ..

```

```

ABORT          ERRORS ..
DIAGNOSTIC      WARNINGS ..
PLANT-REPORT    VERIFICATION=(PV-A)
                SUMMARY=(PS-B,BEPS)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON          =DAY-SCHEDULE (1,24) (1.) ..
PD_OFF         =DAY-SCHEDULE (1,24) (0.) ..

PW_OFF         =WEEK-SCHEDULE (ALL) PD_OFF ..
PW_ON          =WEEK-SCHEDULE (ALL) PD_ON ..

```

## \$ HEATING SEASON

```

P_HEAT        =SCHEDULE THRU MAY 15 PW_ON
                THRU OCT 1 PW_OFF
                THRU DEC 31 PW_ON ..

```

## \$ EQUIPMENT DESCRIPTION

```

FLOOR-PANL    =PLANT-EQUIPMENT  TYPE = HW-BOILER
                SIZE = -999. ..

```

```

RES-FRUNCE    =PLANT-EQUIPMENT  TYPE = FURNACE
                SIZE = -999. ..

```

```

PLANT-PARAMETERS  BOILER-FUEL = NATURAL-GAS  HERM-REC-COND-TYPE = AIR
                  CCIRC-HEAD = 0.0  HCIRC-HEAD = 58.0 ..

```

```

ENERGY-RESOURCE  RESOURCE = ELECTRICITY ..
ENERGY-RESOURCE  RESOURCE = NATURAL-GAS ..

```

-----  
 EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 13:50:58 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS  
 -----

NUMBER OF EXTERIOR SURFACES 7 RECTANGULAR 7 OTHER 0  
 (U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED )

| SURFACE    | SPACE | U-VALUE<br>(BTU/HR-SQFT-F) | GLASS AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | WALL AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | GLASS AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | WALL AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) | AZIMUTH    |
|------------|-------|----------------------------|----------------------|----------------------------|---------------------|----------------------------|----------------------|----------------------------|---------------------|--------------------------------|------------|
| BAY-AREA   |       | 0.000                      | 0.00                 | 0.133                      | 3600.00             | 0.133                      | 3600.00              | 0.133                      | 3600.00             | 3600.00                        | NORTH-EAST |
| OFFICE-ARE |       | 0.490                      | 140.00               | 0.092                      | 1210.00             | 0.133                      | 1210.00              | 0.133                      | 1350.00             | 1350.00                        | SOUTH-EAST |
| BAY-AREA   |       | 0.490                      | 56.00                | 0.133                      | 3544.00             | 0.139                      | 3544.00              | 0.139                      | 3600.00             | 3600.00                        | SOUTH-WEST |
| OFFICE-ARE |       | 0.490                      | 42.00                | 0.092                      | 458.00              | 0.126                      | 458.00               | 0.126                      | 500.00              | 500.00                         | SOUTH-WEST |
| BAY-AREA   |       | 0.490                      | 266.00               | 0.133                      | 1234.00             | 0.196                      | 1234.00              | 0.196                      | 1500.00             | 1500.00                        | NORTH-WEST |
| BAY-AREA   |       | 0.000                      | 0.00                 | 0.092                      | 7440.00             | 0.092                      | 7440.00              | 0.092                      | 7440.00             | 7440.00                        | ROOF       |
| OFFICE-ARE |       | 0.000                      | 0.00                 | 0.092                      | 3035.00             | 0.092                      | 3035.00              | 0.092                      | 3035.00             | 3035.00                        | ROOF       |
| BAY-AREA   |       | 0.000                      | 0.00                 | 0.020                      | 7440.00             | 0.020                      | 7440.00              | 0.020                      | 7440.00             | 7440.00                        | UNDERGRND  |
| OFFICE-ARE |       | 0.000                      | 0.00                 | 0.020                      | 3035.00             | 0.020                      | 3035.00              | 0.020                      | 3035.00             | 3035.00                        | UNDERGRND  |

-----  
 EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 13:50:58 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS  
 -----

|             | AVERAGE<br>U-VALUE/GLASS<br>(BTU/HR-SQFT-F) | AVERAGE<br>U-VALUE/WALLS<br>(BTU/HR-SQFT-F) | AVERAGE U-VALUE<br>WALLS+GLASS<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | OPAQUE<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) |
|-------------|---|---|---|-------------------------|--------------------------|--------------------------------|
| NORTH-EAST  | 0.000                                       | 0.133                                       | 0.133   | 0.00                    | 3600.00                  | 3600.00                        |
| SOUTH-EAST  | 0.490                                       | 0.092                                       | 0.133   | 140.00                  | 1210.00                  | 1350.00                        |
| SOUTH-WEST  | 0.490                                       | 0.128                                       | 0.137   | 98.00                   | 4002.00                  | 4100.00                        |
| NORTH-WEST  | 0.490                                       | 0.133                                       | 0.196   | 266.00                  | 1234.00                  | 1500.00                        |
| ROOF        | 0.000                                       | 0.092                                       | 0.092   | 0.00                    | 10475.00                 | 10475.00                       |
| ALL WALLS   | 0.490                                       | 0.126                                       | 0.144   | 504.00                  | 10046.00                 | 10550.00                       |
| WALLS+ROOFS | 0.490                                       | 0.109                                       | 0.118   | 504.00                  | 20521.00                 | 21025.00                       |
| UNDERGRND   | 0.000                                       | 0.020                                       | 0.020   | 0.00                    | 10475.00                 | 10475.00                       |
| BUILDING    | 0.490                                       | 0.079                                       | 0.086   | 504.00                  | 30996.00                 | 31500.00                       |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 13:50:58 LDL RUN 1  
DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS

\*\*\* BUILDING \*\*\*

FLOOR AREA 10475 SQFT 973 SQMT  
VOLUME 261875 CUFT 7416 CUMT

TIME DRY-BULB TEMP WET-BULB TEMP  
AUG 4 4PM 93F 34C  
70F 21C  
COOLING LOAD  
HEATING LOAD  
JAN 4 3AM 8F -13C  
7F -14C

|                      | SENSIBLE |            | LATENT   |         | SENSIBLE |            |
|----------------------|----------|------------|----------|---------|----------|------------|
|                      | (KBTU/H) | ( KW )     | (KBTU/H) | ( KW )  | (KBTU/H) | ( KW )     |
| WALLS                | 37.634   | 11.022     | 0.000    | 0.000   | -54.297  | -15.902    |
| ROOFS                | 80.424   | 23.554     | 0.000    | 0.000   | -59.094  | -17.307    |
| GLASS CONDUCTION     | 3.393    | 0.994      | 0.000    | 0.000   | -16.272  | -4.766     |
| GLASS SOLAR          | 17.880   | 5.237      | 0.000    | 0.000   | 1.171    | 0.343      |
| DOOR                 | 29.695   | 8.697      | 0.000    | 0.000   | -39.883  | -11.681    |
| INTERNAL SURFACES    | 0.000    | 0.000      | 0.000    | 0.000   | 0.000    | 0.000      |
| UNDERGROUND SURFACES | -0.396   | -0.116     | 0.000    | 0.000   | -5.420   | -1.587     |
| OCCUPANTS TO SPACE   | 13.030   | 3.816      | 25.000   | 7.322   | 1.154    | 0.338      |
| LIGHT TO SPACE       | 48.479   | 14.198     | 0.000    | 0.000   | 7.114    | 2.083      |
| EQUIPMENT TO SPACE   | 3.972    | 1.163      | 0.000    | 0.000   | 0.352    | 0.103      |
| PROCESS TO SPACE     | 0.000    | 0.000      | 0.000    | 0.000   | 0.000    | 0.000      |
| INFILTRATION         | 0.000    | 0.000      | 0.000    | 0.000   | -141.538 | -41.453    |
| TOTAL                | 234.111  | 68.565     | 25.000   | 7.322   | -306.714 | -89.829    |
| TOTAL LOAD           | 259.112  | KBTU/H     | 75.887   | KW      | -306.714 | KBTU/H     |
| TOTAL LOAD / AREA    | 24.74    | BTU/H.SQFT | 77.980   | W /SQMT | 29.281   | BTU/H.SQFT |
|                      |          |            |          |         |          | W /SQMT    |

\*\*\*\*\*  
\* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR \*  
\* LOADS \*  
\* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION \*  
\* IN CONSIDERATION \*  
\*\*\*\*\*

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 13:50:58 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR SIM-IR-HET TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                   |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -91.468                     | 4                       | 3                    | 8.F                  | 7.F                                     | 2843.                     | 14.250                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -69.070                     | 1                       | 23                   | 17.F                 | 15.F                                    | 2572.                     | 14.250                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -55.642                     | 3                       | 4                    | 16.F                 | 13.F                                    | 3114.                     | 14.250                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -18.540                     | 4                       | 4                    | 33.F                 | 31.F                                    | 2843.                     | 14.250                          |
| MAY   | 0.00000                     |                         |                      |                      | 0.000                                   | -3.138                      | 5                       | 6                    | 44.F                 | 40.F                                    | 2843.                     | 14.250                          |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 2978.                     | 14.250                          |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 2708.                     | 14.250                          |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 3114.                     | 14.250                          |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                                   | -1.898                      | 18                      | 2                    | 50.F                 | 48.F                                    | 2843.                     | 14.250                          |
| OCT   | 0.00000                     |                         |                      |                      | 0.000                                   | -15.435                     | 20                      | 6                    | 24.F                 | 23.F                                    | 2708.                     | 14.250                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -43.477                     | 2                       | 6                    | 15.F                 | 14.F                                    | 2708.                     | 14.250                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -82.656                     | 11                      | 24                   | 10.F                 | 9.F                                     | 2843.                     | 14.250                          |
| TOTAL | 0.000                       |                         |                      |                      |   | -381.325                    |                         |                      |                      |   | 34115.                    |                                 |
| TAX   |                             |                         |                      |                      | 0.000                                   |                             |                         |                      |                      | -245.833                                |                           | 14.250                          |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 13:50:58 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR SIM-IR-HET TOPEKA, KS

| MONTH  | N U M B E R O F          |                          |                            |                  | H O U R S                  |                            |                  |                              | C O I N C I D E N T       |                                     |  |  | L O A D S  |  |  |  |
|--------|--------------------------|--------------------------|----------------------------|------------------|----------------------------|----------------------------|------------------|------------------------------|---------------------------|-------------------------------------|--|--|--|--|--|--|
|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOAING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOAING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0                        | 743                      | 0                          | 1                | 744                        | 744                        | 744              | 0                            | 0                         | 1                                   | -108.973   | 0.000  | -108.973   | 0.000  | -108.973   | 0.000  |
| FEB    | 0                        | 667                      | 0                          | 5                | 672                        | 672                        | 672              | 0                            | 0                         | 5                                   | -107.643   | 0.000  | -107.643   | 0.000  | -107.643   | 0.000  |
| MAR    | 0                        | 694                      | 0                          | 50               | 744                        | 744                        | 744              | 0                            | 0                         | 50                                  | -108.664   | 0.000  | -108.664   | 0.000  | -108.664   | 0.000  |
| APR    | 0                        | 390                      | 0                          | 330              | 720                        | 720                        | 720              | 0                            | 0                         | 330                                 | -18.920  | 0.000  | -18.920  | 0.000  | -18.920  | 0.000  |
| MAY    | 0                        | 114                      | 0                          | 630              | 744                        | 744                        | 744              | 0                            | 0                         | 630                                 | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| JUN    | 0                        | 0                        | 0                          | 720              | 720                        | 744                        | 744              | 0                            | 0                         | 720                                 | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| JUL    | 0                        | 0                        | 0                          | 744              | 744                        | 744                        | 744              | 0                            | 0                         | 744                                 | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| AUG    | 0                        | 0                        | 0                          | 744              | 744                        | 744                        | 744              | 0                            | 0                         | 744                                 | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| SEP    | 0                        | 71                       | 0                          | 649              | 720                        | 720                        | 744              | 0                            | 0                         | 649                                 | -51.913  | 0.000  | -51.913  | 0.000  | -51.913  | 0.000  |
| OCT    | 0                        | 388                      | 0                          | 356              | 744                        | 744                        | 744              | 0                            | 0                         | 356                                 | -81.250  | 0.000  | -81.250  | 0.000  | -81.250  | 0.000  |
| NOV    | 0                        | 630                      | 0                          | 90               | 720                        | 720                        | 720              | 0                            | 0                         | 90                                  | -118.589   | 0.000  | -118.589   | 0.000  | -118.589   | 0.000  |
| DEC    | 0                        | 740                      | 0                          | 4                | 744                        | 744                        | 744              | 0                            | 0                         | 4                                   | -120.358   | 0.000  | -120.358   | 0.000  | -120.358   | 0.000  |
| ANNUAL | 0                        | 4437                     | 0                          | 4323             | 8760                       | 8760                       | 8760             | 0                            | 0                         | 4323                                |  |  |  |  |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 13:50:58 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR RES-FURNCE TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                   |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -15.017                     | 16                      | 6                    | 10.F                 | 8.F                                     | 2063.                     | 7.774                           |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -10.656                     | 3                       | 6                    | -1.F                 | -2.F                                    | 1850.                     | 7.774                           |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -7.591                      | 3                       | 5                    | 15.F                 | 13.F                                    | 2086.                     | 7.774                           |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -1.828                      | 5                       | 6                    | 31.F                 | 28.F                                    | 2367.                     | 7.774                           |
| MAY   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.281                      | 9                       | 5                    | 45.F                 | 44.F                                    | 1955.                     | 7.774                           |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1024.                     | 4.942                           |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 923.                      | 4.942                           |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1063.                     | 4.942                           |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 995.                      | 4.942                           |
| OCT   | 0.00000                     |                         |                      |                      | 0.000                                   | -1.084                      | 31                      | 6                    | 44.F                 | 39.F                                    | 2642.                     | 7.774                           |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -5.524                      | 2                       | 5                    | 16.F                 | 15.F                                    | 2089.                     | 7.774                           |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -13.335                     | 12                      | 6                    | 3.F                  | 2.F                                     | 2049.                     | 7.774                           |
| TOTAL | 0.000                       |                         |                      |                      |   | -55.315                     |                         |                      |                      |   | 21105.                    |                                 |
| MAX   |                             |                         |                      |                      | 0.000                                   |                             |                         |                      |                      |   | -79.690                   | 7.774                           |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 13:50:58 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR RES-FURNCE TOPEKA, KS

| MONTH  | H O U R S       |                 |                   |          | H O U R S         |                   |         |                   | C O I N C I D E N T |         |                   |                   | H O U R S         |                   |         |                   | C O I N C I D E N T |         |                   |                   |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|---------|-------------------|---------------------|---------|-------------------|-------------------|-------------------|-------------------|---------|-------------------|---------------------|---------|-------------------|-------------------|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | HEATING<br>AVAIL. | COOLING<br>AVAIL.   | FANS ON | HEATING<br>AVAIL. | COOLING<br>AVAIL. | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | HEATING<br>AVAIL. | COOLING<br>AVAIL.   | FANS ON | HEATING<br>AVAIL. | COOLING<br>AVAIL. |
| JAN    | 0               | 359             | 0                 | 385      | 744               | 0                 | 361     | 744               | 0                   | 361     | 744               | 0                 | 361               | 744               | 0       | 361               | 744                 | 0       | 361               | 744               |
| FEB    | 0               | 320             | 0                 | 352      | 672               | 0                 | 321     | 672               | 0                   | 321     | 672               | 0                 | 321               | 672               | 0       | 321               | 672                 | 0       | 321               | 672               |
| MAR    | 0               | 307             | 0                 | 437      | 744               | 0                 | 337     | 744               | 0                   | 337     | 744               | 0                 | 337               | 744               | 0       | 337               | 744                 | 0       | 337               | 744               |
| APR    | 0               | 331             | 0                 | 389      | 720               | 0                 | 476     | 720               | 0                   | 476     | 720               | 0                 | 476               | 720               | 0       | 476               | 720                 | 0       | 476               | 720               |
| MAY    | 0               | 211             | 0                 | 533      | 744               | 0                 | 336     | 744               | 0                   | 336     | 744               | 0                 | 336               | 744               | 0       | 336               | 744                 | 0       | 336               | 744               |
| JUN    | 0               | 0               | 0                 | 720      | 744               | 0                 | 0       | 744               | 0                   | 0       | 744               | 0                 | 0                 | 744               | 0       | 0                 | 744                 | 0       | 0                 | 744               |
| JUL    | 0               | 0               | 0                 | 744      | 744               | 0                 | 0       | 744               | 0                   | 0       | 744               | 0                 | 0                 | 744               | 0       | 0                 | 744                 | 0       | 0                 | 744               |
| AUG    | 0               | 0               | 0                 | 744      | 744               | 0                 | 0       | 744               | 0                   | 0       | 744               | 0                 | 0                 | 744               | 0       | 0                 | 744                 | 0       | 0                 | 744               |
| SEP    | 0               | 0               | 0                 | 720      | 744               | 0                 | 0       | 744               | 0                   | 0       | 744               | 0                 | 0                 | 744               | 0       | 0                 | 744                 | 0       | 0                 | 744               |
| OCT    | 0               | 383             | 0                 | 361      | 744               | 0                 | 589     | 744               | 0                   | 589     | 744               | 0                 | 589               | 744               | 0       | 589               | 744                 | 0       | 589               | 744               |
| NOV    | 0               | 320             | 0                 | 400      | 720               | 0                 | 389     | 720               | 0                   | 389     | 720               | 0                 | 389               | 720               | 0       | 389               | 720                 | 0       | 389               | 720               |
| DEC    | 0               | 353             | 0                 | 391      | 744               | 0                 | 356     | 744               | 0                   | 356     | 744               | 0                 | 356               | 744               | 0       | 356               | 744                 | 0       | 356               | 744               |
| ANNUAL | 0               | 2584            | 0                 | 6176     | 8760              | 0                 | 3165    | 8760              | 0                   | 3165    | 8760              | 0                 | 3165              | 8760              | 0       | 3165              | 8760                | 0       | 3165              | 8760              |

EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 13:50:58 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE BASELINE SIMULATION FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- PS-B TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>18.854<br>80.171<br>14/ 8 | NATURAL-GAS<br>156.494<br>437.552<br>4/ 4 |
|-----|--|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 16.689<br>78.914<br>2/ 8                 | 119.470<br>376.972<br>3/ 6                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 19.032<br>78.849<br>3/ 9                 | 96.734<br>364.827<br>3/ 5                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 18.216<br>77.623<br>4/ 8                 | 34.769<br>245.127<br>4/ 6                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 16.456<br>75.615<br>5/ 9                 | 8.195<br>116.652<br>5/ 6                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 13.667<br>65.531<br>22/ 8                | 1.152<br>1.600<br>30/ 1                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 12.395<br>65.531<br>29/ 8                | 1.190<br>1.600<br>31/ 1                   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 14.262<br>65.531<br>4/ 8                 | 1.190<br>1.600<br>31/ 1                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 13.148<br>65.970<br>30/ 9                | 4.295<br>88.804<br>18/ 2                  |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 18.620<br>77.249<br>20/ 8                | 29.690<br>205.198<br>31/ 6                |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 17.376<br>77.704<br>30/ 9                | 76.628<br>290.292<br>2/ 5                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 18.603<br>79.746<br>14/ 8                | 142.564<br>406.760<br>11/24               |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |  |   |
|     | ONE YEAR<br>USE/PEAK                             | 197.318<br>80.171                        | 672.371<br>437.552                        |

EMC

DENVER, CO

ENGINEERS

REPORT- BEPS

INC.

80227

ESTIMATED BUILDING ENERGY PERFORMANCE

EZDOE - ELITE SOFTWARE DEVELOPMENT INC

DOE-2.1D 5/16/1995 13:50:58 PDL RUN 1

VEHICAL MAINT W/ DOORS CLOSED IN BAY

TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 0.00        | 668.91      |
| SPACE COOL      | 1.88        | 0.00        |
| HVAC AUX        | 39.38       | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 145.12      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 10.95       | 0.00        |
| TOTAL           | 197.32      | 668.91      |

TOTAL SITE ENERGY 869.69 MBTU 83.0 KBTU/SQFT-YR GROSS-AREA 83.0 KBTU/SQFT-YR NET-AREA  
TOTAL SOURCE ENERGY 1264.92 MBTU 120.8 KBTU/SQFT-YR GROSS-AREA 120.8 KBTU/SQFT-YR NET-AREA  
PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0  
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



E-W HEIGHT = 25.0 WIDTH = 20.0 CONS = EXWALL-2  
 AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 2.8 WIDTH = 5.0 G-T = 2\_PN\_STD  
 MULTIPLIER = 3.0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 5.0 WIDTH = 607.0 CONS = FLOOR ..

ROOF HEIGHT = 5.0 WIDTH = 607.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #1 NIGHT SETBACK FOR BLDG. #8300 \*  
 LINE-5 \*VEHICAL MAINT W/ DOORS CLOSED IN BAY \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,6) (55.)  
 (7,17) (74.)  
 (18,24) (55.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,6) (85.)  
 (7,17) (72.)  
 (18,24) (85.) ..  
 SD\_WT-VENT =DAY-SCHEDULE (1,24) (0.5) ..  
 SD\_HT\_69F =DAY-SCHEDULE (1,6) (50.)  
 (7,17) (69.)  
 (18,24) (50.) ..  
 SD\_FORCOFF =DAY-SCHEDULE (1,24) (-1.) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,6) (60.)  
 (7,17) (79.)  
 (18,24) (60.) ..



```

SD_SM_HT   =DAY-SCHEDULE (1,6) (80.)
              (7,17) (67.)
              (18,24) (80.) ..
SD_FAN_CYC =DAY-SCHEDULE (1,24) (0.) ..
SD_WT_HT_D =DAY-SCHEDULE (1,24) (55.) ..
SD_SM_CL_D =DAY-SCHEDULE (1,24) (85.) ..
SD_HT_BA_D =DAY-SCHEDULE (1,24) (50.) ..
SD_WT_CL_D =DAY-SCHEDULE (1,24) (60.) ..
SD_SM_HT_D =DAY-SCHEDULE (1,24) (80.) ..
SD_FAN_WK  =DAY-SCHEDULE (1,17) (0.)
              (18,24) (-1.) ..
SD_FAN_WKD =DAY-SCHEDULE (1,24) (0.) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..

SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT   =WEEK-SCHEDULE (WD) SD_WT_HT
              (WEH) SD_WT_HT_D ..

SW_SM_CL   =WEEK-SCHEDULE (WD) SD_SM_CL
              (WEH) SD_SM_CL_D ..

SW_WT-VENT =WEEK-SCHEDULE (ALL) SD_WT-VENT ..

SW_HT_69F  =WEEK-SCHEDULE (WD) SD_HT_69F
              (WEH) SD_HT_BA_D ..

SW_FORCOFF =WEEK-SCHEDULE (ALL) SD_FORCOFF ..

SW_WT_CL   =WEEK-SCHEDULE (WD) SD_WT_CL
              (WEH) SD_WT_CL_D ..

SW_SM_HT   =WEEK-SCHEDULE (WD) SD_SM_HT
              (WEH) SD_SM_HT_D ..

SW_FAN_CYC =WEEK-SCHEDULE (WD) SD_FAN_WK
              (WEH) SD_FAN_WKD ..

```

## \$ FULL ON SYSTEM

```

S_ON      =SCHEDULE THRU DEC 31 SW_ON ..

```

## \$ FULL OFF SYSTEM

```

S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..

```

## \$ HEATING SEASON

```

S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT 1 SW_OFF
              THRU DEC 31 SW_ON ..

```

## \$ FORCE FAN OFF DUR SUMM

```

S_CL_FANOF =SCHEDULE THRU MAY 15 SW_FAN_CYC
              THRU OCT 1 SW_FORCOFF
              THRU DEC 31 SW_FAN_CYC ..

```



## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

## \$ 50%OA IN WT-100% IN SUM

S\_VENT\_SCH =SCHEDULE THRU MAY 15 SW\_WT-VENT  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_WT-VENT ..

## \$ HEATING SET TEMP =69F

S\_HT\_F\_69 =SCHEDULE THRU DEC 31 SW\_HT\_69F ..

S\_HRLY-RPS =SCHEDULE THRU JAN 1 SW\_OFF  
 THRU JAN 2 SW\_ON  
 THRU JAN 3 SW\_OFF  
 THRU JAN 4 SW\_ON  
 THRU AUG 6 SW\_OFF  
 THRU AUG 8 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

## \$ ZONE DESCRIPTION

BAY-AREA =ZONE DESIGN-HEAT-T = 69.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_F\_69 COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

OFFICE-ARE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 5.0  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

SIM-IR-HET =SYSTEM SYSTEM-TYPE = FPH  
 HEATING-SCHEDULE = S\_ON  
 ZONE-NAMES = (BAY-AREA) ..

RES-FURNCE =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_ON COOLING-SCHEDULE = S\_OFF  
 OA-CONTROL = FIXED SUPPLY-CFM = 4800.  
 RATED-CFM = 4800. MIN-OUTSIDE-AIR = 0.07

```

MAX-OA-FRACTION = 0.07    FAN-SCHEDULE = S_CL_FANOF
SUPPLY-DELTA-T = 1.8    SUPPLY-KW = 0.00059
FAN-PLACEMENT = BLOW-THROUGH
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY    NIGHT-VENT-DT = 0.0
COOL-FT-MIN = 0.    HEATING-CAPACITY = -300000.
MIN-HP-T = 0.    MAX-HP-SUPP-T = 0.    DEFROST-T = 0.
CRANKCASE-MAX-T = 65.    OUTSIDE-FAN-T = 45.
SIZING-OPTION = COINCIDENT
ZONE-NAMES = (OFFICE-ARE)    ..

```

## \$ HOURLY REPORT DESCRIPTION

```

BAY-ZN-BLK =REPORT-BLOCK VARIABLE-TYPE = BAY-AREA
                                VARIABLE-LIST = (17,18,7,6) ..
OFFIC-BLK =REPORT-BLOCK VARIABLE-TYPE = OFFICE-ARE
                                VARIABLE-LIST = (17,18,7,6) ..
IRHEAT-BLK =REPORT-BLOCK VARIABLE-TYPE = SIM-IR-HET
                                VARIABLE-LIST = (3,5,7) ..
R-FURN-BLK =REPORT-BLOCK VARIABLE-TYPE = RES-FURNCE
                                VARIABLE-LIST = (3,5,6,17) ..
SYSTEM-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPS
                                REPORT-BLOCK = (IRHEAT-BLK,R-FURN-BLK)
..
ZONES-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPS
                                REPORT-BLOCK = (BAY-ZN-BLK,OFFIC-BLK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$EZ - DOE  PLANTS  INPUT$
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE LINE-1 *      EMC      ENGINEERS      INC.      *
      LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
      LINE-3 *      DENVER,      CO      80227      *

      LINE-4 *RUN #1 NIGHT SETBACK FOR BLDG. #8300      *
      LINE-5 *VEHICAL MAINT W/ DOORS CLOSED IN BAY      * ..

```

```

ABORT                ERRORS  ..
DIAGNOSTIC           WARNINGS ..
PLANT-REPORT         VERIFICATION= (PV-A)
                     SUMMARY= (PS-B,BEPS)
                     HOURLY-DATA-SAVE = YES  ..

```

## \$ SCHEDULES

PD ON =DAY-SCHEDULE (1,24) (1.) ..

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 11:17:40 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                       |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|-----------------------|
| DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY     |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                       |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR SIM-IR-HET TOPEKA, KS                            |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                       |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----                                    |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                       |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | ELEC-<br>LOAD<br>(KW) |
| JAN  | 0.00000                     |                         |                      |                      | -64.136                     | 31 10                   | 31.F                 | 26.F                 | -258.259                                | 2843.                     | 14.250                |
| FEB  | 0.00000                     |                         |                      |                      | -45.328                     | 28 10                   | 33.F                 | 30.F                 | -258.259                                | 2572.                     | 14.250                |
| MAR  | 0.00000                     |                         |                      |                      | -36.624                     | 30 7                    | 25.F                 | 21.F                 | -258.259                                | 3114.                     | 14.250                |
| APR  | 0.00000                     |                         |                      |                      | -10.247                     | 4 7                     | 32.F                 | 30.F                 | -236.739                                | 2843.                     | 14.250                |
| MAY  | 0.00000                     |                         |                      |                      | -0.952                      | 9 7                     | 43.F                 | 43.F                 | -118.059                                | 2843.                     | 14.250                |
| JUN  | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 2978.                     | 14.250                |
| JUL  | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 2708.                     | 14.250                |
| AUG  | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 3114.                     | 14.250                |
| SEP  | 0.00000                     |                         |                      |                      | -0.359                      | 30 7                    | 46.F                 | 45.F                 | -45.253                                 | 2843.                     | 14.250                |
| OCT  | 0.00000                     |                         |                      |                      | -7.189                      | 31 7                    | 43.F                 | 39.F                 | -247.797                                | 2708.                     | 14.250                |
| NOV  | 0.00000                     |                         |                      |                      | -25.857                     | 28 8                    | 30.F                 | 28.F                 | -258.259                                | 2708.                     | 14.250                |
| DEC  | 0.00000                     |                         |                      |                      | -53.649                     | 30 9                    | 21.F                 | 19.F                 | -258.259                                | 2843.                     | 14.250                |
| TOTAL  | 0.000                       |                         |                      |                      | -244.342                    |                         |                      |                      | -258.259                                | 34115.                    | 14.250                |
| MAX  |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                       |

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 11:17:40 SDL RUN 1 |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
|--|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY     |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR SIM-IR-HET TOPEKA, KS                               |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----  |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | --COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN  | 0                        | 495                      | 0  | 249               | 744                        | 744                        | 744                          | 0                         | 249                                  | 0.000  | 0.000  |
| FEB  | 0                        | 328                      | 0  | 344               | 672                        | 672                        | 672                          | 0                         | 344                                  | 0.000  | 0.000  |
| MAR  | 0                        | 291                      | 0  | 453               | 744                        | 744                        | 744                          | 0                         | 453                                  | 0.000  | 0.000  |
| APR  | 0                        | 137                      | 0  | 583               | 720                        | 720                        | 720                          | 0                         | 583                                  | 0.000  | 0.000  |
| MAY  | 0                        | 34                       | 0  | 710               | 744                        | 744                        | 744                          | 0                         | 710                                  | 0.000  | 0.000  |
| JUN  | 0                        | 0                        | 0  | 720               | 720                        | 720                        | 720                          | 0                         | 720                                  | 0.000  | 0.000  |
| JUL  | 0                        | 0                        | 0  | 744               | 744                        | 744                        | 744                          | 0                         | 744                                  | 0.000  | 0.000  |
| AUG  | 0                        | 0                        | 0  | 744               | 744                        | 744                        | 744                          | 0                         | 744                                  | 0.000  | 0.000  |
| SEP  | 0                        | 16                       | 0  | 704               | 720                        | 720                        | 720                          | 0                         | 704                                  | 0.000  | 0.000  |
| OCT  | 0                        | 114                      | 0  | 630               | 744                        | 744                        | 744                          | 0                         | 630                                  | 0.000  | 0.000  |
| NOV  | 0                        | 236                      | 0  | 484               | 720                        | 720                        | 720                          | 0                         | 484                                  | 0.000  | 0.000  |
| DEC  | 0                        | 381                      | 0  | 363               | 744                        | 744                        | 744                          | 0                         | 363                                  | -35.506  | 0.000  |
| ANNUAL   | 0                        | 2032                     | 0  | 6728              | 8760                       | 8760                       | 8760                         | 0                         | 6728                                 |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOB-2.1D 6/ 2/1995 11:17:40 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR RES-FURNCE TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |   |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -9.921                      | 4                       | 7                    | 5.F                  | 0.000                                   | -107.166                                | 1646.                              | 7.774                           |
| FEB   | 0.00000                     |                         |                      |                      | -6.420                      | 22                      | 7                    | 24.F                 | 0.000                                   | -95.114                                 | 1426.                              | 7.774                           |
| MAR   | 0.00000                     |                         |                      |                      | -4.170                      | 14                      | 7                    | 16.F                 | 0.000                                   | -88.608                                 | 1918.                              | 7.774                           |
| APR   | 0.00000                     |                         |                      |                      | -0.799                      | 5                       | 7                    | 30.F                 | 0.000                                   | -49.018                                 | 2274.                              | 7.774                           |
| MAY   | 0.00000                     |                         |                      |                      | -0.122                      | 1                       | 13                   | 67.F                 | 0.000                                   | -3.312                                  | 1715.                              | 7.774                           |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 0.000                                   | 1024.                              | 4.942                           |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 0.000                                   | 923.                               | 4.942                           |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 0.000                                   | 1063.                              | 4.942                           |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 0.000                                   | 995.                               | 4.942                           |
| OCT   | 0.00000                     |                         |                      |                      | -0.442                      | 31                      | 7                    | 43.F                 | 0.000                                   | -38.290                                 | 2356.                              | 7.774                           |
| NOV   | 0.00000                     |                         |                      |                      | -2.475                      | 14                      | 7                    | 32.F                 | 0.000                                   | -76.769                                 | 1902.                              | 7.774                           |
| DEC   | 0.00000                     |                         |                      |                      | -8.017                      | 12                      | 7                    | 2.F                  | 0.000                                   | -112.694                                | 1700.                              | 7.774                           |
| TOTAL | 0.000                       |                         |                      |                      | -32.365                     |                         |                      |                      |   | -112.694                                | 18942.                             | 7.774                           |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      | 0.000                                   |   |                                    |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOB-2.1D 6/ 2/1995 11:17:40 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR RES-FURNCE TOPEKA, KS

| MONTH  | HOURS           |                 |                   |          | HOURS             |                   |         |                   | HOURS   |                   |                   |         | COINCIDENT LOADS           |                             |                 |                             |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|---------|-------------------|---------|-------------------|-------------------|---------|----------------------------|-----------------------------|-----------------|-----------------------------|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | COOLING<br>AVAIL. | FANS ON | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | HEATING<br>LOAD AT<br>PEAK | ELECTRIC<br>LOAD AT<br>PEAK | COOLING<br>PEAK | ELECTRIC<br>LOAD AT<br>PEAK |
| JAN    | 0               | 212             | 0                 | 532      | 744               | 0                 | 214     | 0                 | 214     | 0                 | 214               | 0       | 0.000                      | 0.000                       | 0.100           | 0.100                       |
| FEB    | 0               | 162             | 0                 | 510      | 672               | 0                 | 171     | 0                 | 171     | 0                 | 171               | 0       | 0.000                      | 0.000                       | 0.100           | 0.100                       |
| MAR    | 0               | 224             | 0                 | 520      | 744               | 0                 | 278     | 0                 | 278     | 0                 | 278               | 0       | 0.000                      | 0.000                       | 0.100           | 0.100                       |
| APR    | 0               | 250             | 0                 | 470      | 720               | 0                 | 443     | 0                 | 443     | 0                 | 443               | 0       | -1.810                     | 2.932                       | 2.932           | 2.932                       |
| MAY    | 0               | 136             | 0                 | 608      | 744               | 0                 | 251     | 0                 | 251     | 0                 | 251               | 0       | 0.000                      | 0.000                       | 0.100           | 0.100                       |
| JUN    | 0               | 0               | 0                 | 720      | 720               | 0                 | 0       | 0                 | 0       | 0                 | 0                 | 0       | 0.000                      | 0.000                       | 0.000           | 0.000                       |
| JUL    | 0               | 0               | 0                 | 744      | 744               | 0                 | 0       | 0                 | 0       | 0                 | 0                 | 0       | 0.000                      | 0.000                       | 0.000           | 0.000                       |
| AUG    | 0               | 0               | 0                 | 744      | 744               | 0                 | 0       | 0                 | 0       | 0                 | 0                 | 0       | 0.000                      | 0.000                       | 0.000           | 0.000                       |
| SEP    | 0               | 0               | 0                 | 720      | 720               | 0                 | 0       | 0                 | 0       | 0                 | 0                 | 0       | 0.000                      | 0.000                       | 0.100           | 0.100                       |
| OCT    | 0               | 283             | 0                 | 461      | 744               | 0                 | 488     | 0                 | 488     | 0                 | 488               | 0       | 0.000                      | 0.000                       | 0.100           | 0.100                       |
| NOV    | 0               | 238             | 0                 | 482      | 720               | 0                 | 323     | 0                 | 323     | 0                 | 323               | 0       | 0.000                      | 0.000                       | 0.100           | 0.100                       |
| DEC    | 0               | 209             | 0                 | 535      | 744               | 0                 | 233     | 0                 | 233     | 0                 | 233               | 0       | -21.020                    | 2.932                       | 2.932           | 2.932                       |
| ANNUAL | 0               | 1714            | 0                 | 7046     | 8760              | 0                 | 2401    | 0                 | 2401    | 0                 | 2401              | 0       |                            |                             |                 |                             |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 11:17:40 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>16.804<br>81.141<br>31/ 9 | NATURAL-GAS<br>107.321<br>508.661<br>4/ 7 |
|-----|--|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 14.692<br>81.141<br>28/ 9                | 75.076<br>492.096<br>22/ 7                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 18.024<br>81.141<br>14/11                | 60.790<br>483.092<br>14/ 7                |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 17.706<br>79.852<br>4/ 9                 | 19.230<br>389.056<br>4/ 7                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 15.583<br>75.201<br>13/ 8                | 3.856<br>173.464<br>9/ 7                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 13.667<br>65.531<br>22/ 8                | 1.152<br>1.600<br>30/ 1                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 12.395<br>65.531<br>29/ 8                | 1.190<br>1.600<br>31/ 1                   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 14.262<br>65.531<br>4/ 8                 | 1.190<br>1.600<br>31/ 1                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 13.113<br>66.245<br>30/ 9                | 1.768<br>72.928<br>30/ 7                  |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 17.454<br>79.496<br>31/ 9                | 14.571<br>399.672<br>31/ 7                |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 16.333<br>81.141<br>14/ 9                | 43.546<br>466.596<br>14/ 7                |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 16.746<br>81.141<br>30/ 9                | 89.136<br>516.209<br>12/ 7                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |  |   |
|     | ONE YEAR<br>USE/PEAK                             | 186.779<br>81.141                        | 418.827<br>516.209                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/2/1995 11:17:40 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE   |             |                              |                            |
|---|-------------|------------------------------|----------------------------|
| IN SITE MBTU -  | ELECTRICITY | NATURAL-GAS                  |                            |
| CATEGORY OF USE   |             |                              |                            |
| SPACE HEAT  | 0.00        | 413.44                       |                            |
| SPACE COOL  | 1.88        | 0.00                         |                            |
| HVAC AUX  | 28.84       | 0.00                         |                            |
| DOM HOT WTR   | 0.00        | 0.00                         |                            |
| AUX SOLAR   | 0.00        | 0.00                         |                            |
| LIGHTS  | 145.12      | 0.00                         |                            |
| VERT TRANS  | 0.00        | 0.00                         |                            |
| MISC EQUIP  | 10.95       | 0.00                         |                            |
| TOTAL   | 186.78      | 413.44                       |                            |
| TOTAL SITE ENERGY   | 605.61 MBTU | 57.8 KBTU/SQFT-YR GROSS-AREA | 57.8 KBTU/SQFT-YR NET-AREA |
| TOTAL SOURCE ENERGY   | 979.73 MBTU | 93.5 KBTU/SQFT-YR GROSS-AREA | 93.5 KBTU/SQFT-YR NET-AREA |
| PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 2.3  |             |                              |                            |
| PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0   |             |                              |                            |
| NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY. |             |                              |                            |

E-W HEIGHT = 25.0 WIDTH = 20.0 CONS = EXWALL-2  
 AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 2.8 WIDTH = 5.0 G-T = 2\_PN\_STD  
 MULTIPLIER = 3.0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 5.0 WIDTH = 607.0 CONS = FLOOR ..

ROOF HEIGHT = 5.0 WIDTH = 607.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #2 DDC CONTROL FOR BLDG. #8300 \*  
 LINE-5 \*VEHICAL MAINT W/ DOORS CLOSED IN BAY \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

# \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,24) (70.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,24) (76.) ..  
 SD\_WT-VENT =DAY-SCHEDULE (1,24) (0.5) ..  
 SD\_HT\_65F =DAY-SCHEDULE (1,24) (65.) ..  
 SD\_FORCOFF =DAY-SCHEDULE (1,24) (-1.) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,24) (75.) ..  
 SD\_SM\_HT =DAY-SCHEDULE (1,24) (71.) ..  
 SD\_FAN\_CYC =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT\_D =DAY-SCHEDULE (1,24) (55.) ..  
 SD\_SM\_CL\_D =DAY-SCHEDULE (1,24) (85.) ..  
 SD\_HT\_BA\_D =DAY-SCHEDULE (1,24) (50.) ..  
 SD\_WT\_CL\_D =DAY-SCHEDULE (1,24) (57.) ..  
 SD\_SM\_HT\_D =DAY-SCHEDULE (1,24) (83.) ..  
 SD\_FAN =DAY-SCHEDULE (1,24) (0.) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..  
SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..  
SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..  
SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..  
SW\_WT-VENT =WEEK-SCHEDULE (ALL) SD\_WT-VENT ..  
SW\_HT\_65F =WEEK-SCHEDULE (ALL) SD\_HT\_65F ..  
SW\_FORCOFF =WEEK-SCHEDULE (ALL) SD\_FORCOFF ..  
SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..  
SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..  
SW\_FAN\_CYC =WEEK-SCHEDULE (ALL) SD\_FAN ..

## \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
THRU OCT 1 SW\_OFF  
THRU DEC 31 SW\_ON ..

## \$ FORCE FAN OFF DUR SUMM

S\_CL\_FANOF =SCHEDULE THRU MAY 15 SW\_FAN\_CYC  
THRU OCT 1 SW\_FORCOFF  
THRU DEC 31 SW\_FAN\_CYC ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

## \$ 50%OA IN WT-100% IN SUM

S\_VENT\_SCH =SCHEDULE THRU MAY 15 SW\_WT-VENT  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_WT-VENT ..

## \$ HEATING SET TEMP =65F

S\_HT\_F\_65 =SCHEDULE THRU DEC 31 SW\_HT\_65F ..



S\_HRLY-RPS =SCHEDULE THRU JAN 1 SW\_OFF  
 THRU JAN 2 SW\_ON  
 THRU JAN 3 SW\_OFF  
 THRU JAN 4 SW\_ON  
 THRU AUG 6 SW\_OFF  
 THRU AUG 8 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

#### \$ ZONE DESCRIPTION

BAY-AREA =ZONE DESIGN-HEAT-T = 69.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_F\_65 COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

OFFICE-ARE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 5.0  
 SIZING-OPTION = FROM-LOADS ..

#### \$ SYSTEM DESCRIPTION

SIM-IR-HET =SYSTEM SYSTEM-TYPE = FPH  
 HEATING-SCHEDULE = S\_ON  
 ZONE-NAMES = (BAY-AREA) ..

RES-FURNCE =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_ON COOLING-SCHEDULE = S\_OFF  
 OA-CONTROL = FIXED SUPPLY-CFM = 4800.  
 RATED-CFM = 4800. MIN-OUTSIDE-AIR = 0.07  
 MAX-OA-FRACTION = 0.07 FAN-SCHEDULE = S\_CL\_FANOF  
 SUPPLY-DELTA-T = 1.8 SUPPLY-KW = 0.00059  
 FAN-PLACEMENT = BLOW-THROUGH  
 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY NIGHT-VENT-DT = 0.0  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -300000.  
 MIN-HP-T = 0. MAX-HP-SUPP-T = 0. DEFROST-T = 0.  
 CRANKCASE-MAX-T = 65. OUTSIDE-FAN-T = 45.  
 SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (OFFICE-ARE) ..

#### \$ HOURLY REPORT DESCRIPTION

BAY-ZN-BLK =REPORT-BLOCK VARIABLE-TYPE = BAY-AREA  
 VARIABLE-LIST = (17,18,7,6) ..  
 OFFIC-BLK =REPORT-BLOCK VARIABLE-TYPE = OFFICE-ARE  
 VARIABLE-LIST = (17,18,7,6) ..  
 IRHEAT-BLK =REPORT-BLOCK VARIABLE-TYPE = SIM-IR-HET

```

      VARIABLE-LIST = (3,5,7) ..
R-FURN-BLK =REPORT-BLOCK VARIABLE-TYPE = RES-FURNCE
      VARIABLE-LIST = (3,5,6,17) ..
SYSTEM-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPS
      REPORT-BLOCK = (IRHEAT-BLK,R-FURN-BLK)
..
ZONES-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPS
      REPORT-BLOCK = (BAY-ZN-BLK,OFFIC-BLK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
      LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
      LINE-3 *      DENVER,      CO      80227      *

      LINE-4 *RUN #2 DDC CONTROL FOR BLDG. #8300      *
      LINE-5 *VEHICAL MAINT W/ DOORS CLOSED IN BAY      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
PLANT-REPORT VERIFICATION=(PV-A)
      SUMMARY=(PS-B,BEPS)
      HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON      =DAY-SCHEDULE (1,24) (1.) ..
PD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

PW_OFF     =WEEK-SCHEDULE (ALL) PD_OFF ..
PW_ON      =WEEK-SCHEDULE (ALL) PD_ON ..

```

## \$ HEATING SEASON

```

P_HEAT     =SCHEDULE THRU MAY 15 PW_ON
      THRU OCT 1 PW_OFF
      THRU DEC 31 PW_ON ..

```

## \$ EQUIPMENT DESCRIPTION

```

FLOOR-PANL =PLANT-EQUIPMENT TYPE = HW-BOILER

```

EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/2/1995 11:10:56 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR SIM-IR-HET TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -81.750                     | 4                       | 3                    | 8.F                  | 7.F                                     | 2843.                              | 14.250                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -60.221                     | 1                       | 23                   | 17.F                 | 15.F                                    | 2572.                              | 14.250                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -45.777                     | 3                       | 4                    | 16.F                 | 13.F                                    | 3114.                              | 14.250                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -11.943                     | 4                       | 6                    | 32.F                 | 31.F                                    | 2843.                              | 14.250                          |
| MAY   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.933                      | 9                       | 6                    | 44.F                 | 44.F                                    | 2843.                              | 14.250                          |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 2978.                              | 14.250                          |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 2708.                              | 14.250                          |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 3114.                              | 14.250                          |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.133                      | 30                      | 1                    | 48.F                 | 46.F                                    | 2843.                              | 14.250                          |
| OCT   | 0.00000                     |                         |                      |                      | 0.000                                   | -8.461                      | 20                      | 6                    | 24.F                 | 23.F                                    | 2708.                              | 14.250                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -34.923                     | 2                       | 6                    | 15.F                 | 14.F                                    | 2708.                              | 14.250                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -72.835                     | 11                      | 24                   | 10.F                 | 9.F                                     | 2843.                              | 14.250                          |
| TOTAL | 0.000                       |                         |                      |                      |   | -316.976                    |                         |                      |                      |   | 34115.                             |                                 |
| MAX   |                             |                         |                      |                      | 0.000                                   |                             |                         |                      |                      | -228.361                                |                                    | 14.250                          |

EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/2/1995 11:10:56 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR SIM-IR-HET TOPEKA, KS

| MONTH  | HOURS           |                 |                   |          | N U M B E R       |                   |                   |                   | H O U R S         |                   |                   |                   | C O I N C I D E N T |                   |                   |                   | C O I N C I D E N T |                   |                   |                   |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------|-------------------|-------------------|-------------------|---------------------|-------------------|-------------------|-------------------|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | HEATING<br>AVAIL. | COOLING<br>AVAIL. | HEATING<br>AVAIL. | COOLING<br>AVAIL. | HEATING<br>AVAIL. | COOLING<br>AVAIL. | HEATING<br>AVAIL.   | COOLING<br>AVAIL. | HEATING<br>AVAIL. | COOLING<br>AVAIL. | HEATING<br>AVAIL.   | COOLING<br>AVAIL. | HEATING<br>AVAIL. | COOLING<br>AVAIL. |
| JAN    | 0               | 740             | 0                 | 4        | 744               | 744               | 744               | 744               | 744               | 744               | 744               | 744               | 744                 | 744               | 744               | 744               | 744                 | 744               | 744               | 744               |
| FEB    | 0               | 665             | 0                 | 7        | 672               | 672               | 672               | 672               | 672               | 672               | 672               | 672               | 672                 | 672               | 672               | 672               | 672                 | 672               | 672               | 672               |
| MAR    | 0               | 651             | 0                 | 93       | 744               | 744               | 744               | 744               | 744               | 744               | 744               | 744               | 744                 | 744               | 744               | 744               | 744                 | 744               | 744               | 744               |
| APR    | 0               | 285             | 0                 | 435      | 720               | 720               | 720               | 720               | 720               | 720               | 720               | 720               | 720                 | 720               | 720               | 720               | 720                 | 720               | 720               | 720               |
| MAY    | 0               | 49              | 0                 | 695      | 744               | 744               | 744               | 744               | 744               | 744               | 744               | 744               | 744                 | 744               | 744               | 744               | 744                 | 744               | 744               | 744               |
| JUN    | 0               | 0               | 0                 | 720      | 720               | 720               | 720               | 720               | 720               | 720               | 720               | 720               | 720                 | 720               | 720               | 720               | 720                 | 720               | 720               | 720               |
| JUL    | 0               | 0               | 0                 | 744      | 744               | 744               | 744               | 744               | 744               | 744               | 744               | 744               | 744                 | 744               | 744               | 744               | 744                 | 744               | 744               | 744               |
| AUG    | 0               | 0               | 0                 | 744      | 744               | 744               | 744               | 744               | 744               | 744               | 744               | 744               | 744                 | 744               | 744               | 744               | 744                 | 744               | 744               | 744               |
| SEP    | 0               | 16              | 0                 | 704      | 720               | 720               | 720               | 720               | 720               | 720               | 720               | 720               | 720                 | 720               | 720               | 720               | 720                 | 720               | 720               | 720               |
| OCT    | 0               | 257             | 0                 | 487      | 744               | 744               | 744               | 744               | 744               | 744               | 744               | 744               | 744                 | 744               | 744               | 744               | 744                 | 744               | 744               | 744               |
| NOV    | 0               | 556             | 0                 | 164      | 720               | 720               | 720               | 720               | 720               | 720               | 720               | 720               | 720                 | 720               | 720               | 720               | 720                 | 720               | 720               | 720               |
| DEC    | 0               | 732             | 0                 | 12       | 744               | 744               | 744               | 744               | 744               | 744               | 744               | 744               | 744                 | 744               | 744               | 744               | 744                 | 744               | 744               | 744               |
| ANNUAL | 0               | 3951            | 0                 | 4809     | 8760              | 8760              | 8760              | 8760              | 8760              | 8760              | 8760              | 8760              | 8760                | 8760              | 8760              | 8760              | 8760                | 8760              | 8760              | 8760              |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/2/1995 11:10:56 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR RES-FURNCE TOPEKA, KS

| MONTH | COOLING                     |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING                     |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC                      |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -13.507                     | 16                      | 6                    | 10.F                 | 8.F                                     | 1967.                     | 7.774                           |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -9.293                      | 3                       | 6                    | -1.F                 | -2.F                                    | 1712.                     | 7.774                           |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -6.281                      | 14                      | 6                    | 15.F                 | 13.F                                    | 1757.                     | 7.774                           |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -1.218                      | 5                       | 6                    | 31.F                 | 28.F                                    | 1974.                     | 7.774                           |
| MAY   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.256                      | 3                       | 18                   | 66.F                 | 62.F                                    | 1882.                     | 7.774                           |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1024.                     | 4.942                           |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 923.                      | 4.942                           |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1063.                     | 4.942                           |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 995.                      | 4.942                           |
| OCT   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.658                      | 31                      | 6                    | 44.F                 | 39.F                                    | 2356.                     | 7.774                           |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -4.451                      | 2                       | 6                    | 15.F                 | 14.F                                    | 1655.                     | 7.774                           |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -11.912                     | 12                      | 6                    | 3.F                  | 2.F                                     | 1930.                     | 7.774                           |
| TOTAL | 0.000                       |                         |                      |                      |   | -47.577                     |                         |                      |                      |   | 19236.                    |                                 |
| TAX   |                             |                         |                      |                      | 0.000                                   |                             |                         |                      |                      |   |                           | 7.774                           |
|       |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/2/1995 11:10:56 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR RES-FURNCE TOPEKA, KS

| MONTH  | COOLING         |                          |                            |                   | HEATING                    |                            |                              |                           | COINCIDENT                           |  |  |   | ELECTRIC                |                         |                         |                         |
|--------|-----------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|---|-------------------------|-------------------------|-------------------------|-------------------------|
|        | COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | COINCIDENT<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | COOLING<br>PEAK<br>(KW) | COOLING<br>PEAK<br>(KW) | COOLING<br>PEAK<br>(KW) | COOLING<br>PEAK<br>(KW) |
| JAN    | 0               | 327                      | 0                          | 417               | 744                        | 0                          | 327                          | 0                         | 0                                    | -29.071  | 2.932  | 0   | 0.000                   | 0.100                   | 0.100                   | 2.932                   |
| FEB    | 0               | 272                      | 0                          | 400               | 672                        | 0                          | 272                          | 0                         | 0                                    | 0.000  | 0.000  | 0   | 0.000                   | 0.100                   | 0.100                   | 2.932                   |
| MAR    | 0               | 217                      | 0                          | 527               | 744                        | 0                          | 221                          | 0                         | 4                                    | -29.223  | 2.932  | 0   | 0.000                   | 0.100                   | 0.100                   | 2.932                   |
| APR    | 0               | 221                      | 0                          | 499               | 720                        | 0                          | 337                          | 0                         | 116                                  | -1.855   | 2.932  | 0   | 0.000                   | 0.100                   | 0.100                   | 2.932                   |
| MAY    | 0               | 197                      | 0                          | 547               | 744                        | 0                          | 310                          | 0                         | 113                                  | 0.000  | 0.000  | 0   | 0.000                   | 0.000                   | 0.000                   | 2.932                   |
| JUN    | 0               | 0                        | 0                          | 720               | 744                        | 0                          | 0                            | 0                         | 0                                    | 0.000  | 0.000  | 0   | 0.000                   | 0.000                   | 0.000                   | 2.932                   |
| JUL    | 0               | 0                        | 0                          | 744               | 744                        | 0                          | 0                            | 0                         | 0                                    | 0.000  | 0.000  | 0   | 0.000                   | 0.000                   | 0.000                   | 2.932                   |
| AUG    | 0               | 0                        | 0                          | 744               | 744                        | 0                          | 0                            | 0                         | 0                                    | 0.000  | 0.000  | 0   | 0.000                   | 0.000                   | 0.000                   | 2.932                   |
| SEP    | 0               | 0                        | 0                          | 720               | 744                        | 0                          | 0                            | 0                         | 0                                    | 0.000  | 0.000  | 0   | 0.000                   | 0.000                   | 0.000                   | 2.932                   |
| OCT    | 0               | 310                      | 0                          | 434               | 744                        | 0                          | 488                          | 0                         | 178                                  | 0.000  | 0.000  | 0   | 0.000                   | 0.000                   | 0.000                   | 2.932                   |
| NOV    | 0               | 204                      | 0                          | 516               | 720                        | 0                          | 236                          | 0                         | 32                                   | 0.000  | 0.000  | 0   | 0.000                   | 0.000                   | 0.000                   | 2.932                   |
| DEC    | 0               | 314                      | 0                          | 430               | 744                        | 0                          | 314                          | 0                         | 0                                    | -46.549  | 2.932  | 0   | 0.000                   | 0.000                   | 0.000                   | 2.932                   |
| ANNUAL | 0               | 2062                     | 0                          | 6698              | 8760                       | 0                          | 2505                         | 0                         | 443                                  |  |  |   |                         |                         |                         |                         |

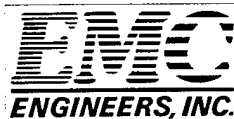
EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 11:10:56 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|-----|--|---|---|
| JAN | 18.302<br>79.824<br>14/ 8                        | 140.325<br>406.830<br>4/ 4                          |   |
| FEB | 16.011<br>78.630<br>3/ 8                         | 104.566<br>353.404<br>3/ 6                          |   |
| MAR | 17.683<br>78.476<br>3/ 9                         | 79.839<br>336.286<br>3/ 5                           |   |
| APR | 16.720<br>77.161<br>4/ 8                         | 23.003<br>216.490<br>4/ 6                           |   |
| MAY | 16.153<br>75.201<br>13/ 8                        | 4.498<br>78.312<br>9/ 6                             |   |
| JUN | 13.667<br>65.531<br>22/ 8                        | 1.152<br>1.600<br>30/ 1                             |   |
| JUL | 12.395<br>65.531<br>29/ 8                        | 1.190<br>1.600<br>31/ 1                             |   |
| AUG | 14.262<br>65.531<br>4/ 8                         | 1.190<br>1.600<br>31/ 1                             |   |
| SEP | 13.108<br>65.531<br>30/16                        | 1.427<br>31.691<br>30/ 1                            |   |
| OCT | 17.483<br>76.510<br>31/ 8                        | 17.722<br>176.225<br>31/ 6                          |   |
| NOV | 15.700<br>77.349<br>30/ 9                        | 61.520<br>276.102<br>2/ 6                           |   |
| DEC | 17.971<br>79.383<br>14/ 8                        | 126.270<br>378.298<br>11/24                         |   |
|     | ONE YEAR<br>USE/PEAK                             | 189.456<br>79.824                                   | 562.703<br>406.830                                  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 11:10:56 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #8300 VEHICAL MAINT W/ DOORS CLOSED IN BAY  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 0.00        | 558.86      |
| SPACE COOL      | 1.88        | 0.00        |
| HVAC AUX        | 31.51       | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 145.12      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 10.95       | 0.00        |
| TOTAL           | 189.45      | 558.86      |

TOTAL SITE ENERGY 752.16 MBTU 71.8 KBTU/SQFT-YR GROSS-AREA 71.8 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1131.64 MBTU 108.0 KBTU/SQFT-YR GROSS-AREA 108.0 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

BUILDING NO.: 8300  
BLDG. TYPE: VEH MAINT SHOP (MAINT BAY DOORS OPEN)

### ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1 | RUN2   | RUN3 | RUN4 | RUN5 |
|----------------|---------|------|--------|------|------|------|
| HEATING (MBtu) | 2460.4  | 0.0  | 2315.6 | 0.0  | 0.0  | 0.0  |
| COOLING (kWH)  | 49,950  | 0    | 49,226 | 0    | 0    | 0    |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 12,688 CFM                        |
| FLOOR AREA     | 8,640 FT <sup>2</sup>             |
| CFMI           | 12688 CFM                         |
| UA             | 2234 BTU/HR-°F                    |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

#### EZDOE COMPUTER RUN DEFINITION:

| BASERUN | EXISTING OPERATION          |
|---------|-----------------------------|
| RUN1    | NIGHT SETBACK               |
| RUN2    | DDC CONTROL                 |
| RUN3    | ECONOMIZER                  |
| RUN4    | NIGHTTIME INFILTRATION (OA) |
| RUN5    | DAYTIME INFILTRATION (OA)   |

#### HOURS OF OCCUPANCY

|                   |     |      |            |
|-------------------|-----|------|------------|
| M-F               | 700 | 1800 | 55 HR      |
| SAT.              | 0   | 0    | 0 HR       |
| SUN.              | 0   | 0    | 0 HR       |
| TOTAL OCCUPY HR.  |     |      | 55 HR/WK   |
| TOTAL UNOCC. HR.  |     |      | 113 HR/WK  |
| ANNUAL OCCUPY HR. |     |      | 2868 HR/YR |
| ANNUAL UNOCC. HR. |     |      | 5892 HR/YR |

#### ANNUAL HEATING & COOLING HOURS

|                 |            |
|-----------------|------------|
| HR. ON HEATING  | 1784 HR/YR |
| HR. ON COOLING  | 1084 HR/YR |
| HR. OFF HEATING | 3664 HR/YR |
| HR. OFF COOLING | 2228 HR/YR |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING

8760 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY

5448 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

3312 HR/YR

|                      |      |   |      |   |            |
|----------------------|------|---|------|---|------------|
| HRS SAVED (HTG ONLY) | 5448 | - | 1784 | = | 3664 HR/YR |
| HRS SAVED (CLG ONLY) | 3312 | - | 1084 | = | 2228 HR/YR |

|           |   |   |              |   |                     |
|-----------|---|---|--------------|---|---------------------|
| HOAUHC    | 2460.42 MBtu  | - | 0 MBtu       | = | 0.00E+00 Btu/CFM-HR |
|           | 12688 CFM   | x | 5892 HR/YR   |   |                     |
| HOAUH     | 2460.42 MBtu  | - | 0 MBtu       | = | 0.00E+00 Btu/CFM-HR |
|           | 12688 CFM   | x | 3664 HR/YR   |   |                     |
| COAUHC    | 49,950.2 kWH  | - | 0.0 kWH      | = | 0.00E+00 kWH/CFM-HR |
|           | 12688 CFM   | x | 5892 HR/YR   |   |                     |
| COAUC     | 49,950.2 kWH  | - | 0.0 kWH      | = | 0.00E+00 kWH/CFM-HR |
|           | 12688 CFM   | x | 2228 HR/YR   |   |                     |
| HOAOHC    | 2460.42 MBtu  | - | 0 MBtu       | = | 0.00E+00 Btu/CFM-HR |
|           | 12688 CFM   | x | 2868 HR/YR   |   |                     |
| HOAOH     | 2460.42 MBtu  | - | 0 MBtu       | = | 0.00E+00 Btu/CFM-HR |
|           | 12688 CFM   | x | 1784 HR/YR   |   |                     |
| COAOHC    | 49,950.2 kWH  | - | 0.0 kWH      | = | 0.00E+00 kWH/CFM-HR |
|           | 12688 CFM   | x | 2868 HR/YR   |   |                     |
| COAOC     | 49,950.2 kWH  | - | 0.0 kWH      | = | 0.00E+00 kWH/CFM-HR |
|           | 12688 CFM   | x | 1084 HR/YR   |   |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |              | = | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |              | = | 0.17                |
| ECC       | 0.0 kWH   | - | 0.0 kWH      | = | 0.00E+00 kWH/CFM-HR |
|           | 12688 CFM   | x | 1084 HR/YR   |   |                     |
| ECHC      | 0.0 kWH   | - | 0.0 kWH      | = | 0.00E+00 kWH/CFM-HR |
|           | 12688 CFM   | x | 2868 HR/YR   |   |                     |
| NSUCHC    | 49,950.2 kWH  | - | 0.0 kWH      | = | 0.00E+00 kWH/CFM-HR |
|           | 12688 CFM   | x | 5892 HR/YR   |   |                     |
| NSUCC     | 49,950.2 kWH  | - | 0.0 kWH      | = | 0.00E+00 kWH/CFM-HR |
|           | 12688 CFM   | x | 2228 HR/YR   |   |                     |
| DDCCHC    | 49,950.2 kWH  | - | 49,226.5 kWH | = | 1.99E-05 kWH/CFM-HR |
|           | 12688 CFM   | x | 2868 HR/YR   |   |                     |
| DDCCC     | 49,950.2 kWH  | - | 49,226.5 kWH | = | 5.26E-05 kWH/CFM-HR |
|           | 12688 CFM   | x | 1084 HR/YR   |   |                     |
| NSC       | 2460.42 MBtu  | - | 0 MBtu       | = | 0.00E+00 Btu/UA     |
|           | 2234.4401 UA  |   |              |   |                     |
| DDCH      | 2460.42 MBtu  | - | 2315.56 MBtu | = | 6.48E+04 Btu/UA     |
|           | 2234.4401 UA  |   |              |   |                     |
| OPT       | ( 2 HR/DAY X 240 DAY/YR )                             | - | 175 HR/YR    | = | 305 HR/YR           |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |              | = | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01         | = | 5.67 HR/YR          |





INPUT LOADS ..

```

$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BLDG. #8300      *
        LINE-5 *VEHICAL MAINT. W/ BAY DOORS OPEN      * ..

```

```

ABORT          ERRORS ..
DIAGNOSTIC     WARNINGS ..
LOADS-REPORT   VERIFICATION=(LV-D)
               SUMMARY=(LS-C,LS-D)
               HOURLY-DATA-SAVE = YES ..
BUILDING-LOCATION LATITUDE = 39.0
                LONGITUDE = 96.5
                ALTITUDE = 1065.
                TIME-ZONE = 6
                GROSS-AREA = 10475
                SHIELDING-COEF = 0.29
                X-REF = 0.0
                Y-REF = 0.0 ..
RUN-PERIOD     JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

```

LD_ON          =DAY-SCHEDULE (1,24) (1.) ..
LD_OFF         =DAY-SCHEDULE (1,24) (0.) ..

LD_PEOPLE      =DAY-SCHEDULE (1,6) (0.)
                (7) (0.5)
                (8,11) (1.)
                (12) (0.5)
                (13,16) (1.)
                (17) (0.5)
                (18,24) (0.) ..

LD_DOORS       =DAY-SCHEDULE (1,7) (0.)
                (8,17) (0.33)
                (18,24) (0.) ..

LW_ON          =WEEK-SCHEDULE (ALL) LD_ON ..
LW_OFF         =WEEK-SCHEDULE (ALL) LD_OFF ..

```

LW\_PEOPLE =WEEK-SCHEDULE (WD) LD\_PEOPLE  
(WEH) LD\_OFF ..

LW\_DOORS =WEEK-SCHEDULE (WD) LD\_DOORS  
(WEH) LD\_OFF ..

\$ ON 100% OF THE TIME

L\_ON =SCHEDULE THRU DEC 31 LW\_ON ..

\$ OFF 100% OF THE TIME

L\_OFF =SCHEDULE THRU DEC 31 LW\_OFF ..

\$ PEOPLE LOAD M-F7.5-17.5

L\_PEOPLE =SCHEDULE THRU DEC 31 LW\_PEOPLE ..

\$ BAY-DOORS OPEN SCHEDULE

L\_BAY-DOOR =SCHEDULE THRU DEC 31 LW\_DOORS ..

#### \$ CONSTRUCTION TYPES

##### \$ EXTERIOR WALL U-VALUE FROM PLANS

EXWALL-1 =CONSTRUCTION U-VALUE = 0.137  
ABSORPTANCE = 0.880  
ROUGHNESS = 2 ..  
FLOOR =CONSTRUCTION U-VALUE = 0.020  
ABSORPTANCE = 0.610  
ROUGHNESS = 5 ..

##### \$ BUILT-UP ROOF U-VALUE FROM PLANS

ROOF-1 =CONSTRUCTION U-VALUE = 0.094  
ABSORPTANCE = 0.800  
ROUGHNESS = 1 ..

##### \$ STANDARD METAL DOOR

DOOR-STD =LAYERS MATERIAL=(HF-A3,IN22,HF-A3) I-F-R= 0.6100  
THICKNESS=(0.005,0.083,0.005) ..  
DOOR-MET =CONSTRUCTION LAYERS = DOOR-STD  
ABSORPTANCE = 0.850  
ROUGHNESS = 5 ..

##### \$ EXTER OFFICE WALL U-VAL FROM PLAN

EXWALL-2 =CONSTRUCTION U-VALUE = 0.094  
ABSORPTANCE = 0.880  
ROUGHNESS = 2 ..

2\_PN\_STD =GLASS-TYPE GLASS-TYPE-CODE = 2  
PANES = 2 ..

## \$ SPACE DESCRIPTION

BAY-AREA =SPACE AREA = 8640.0 VOLUME = 216000.0  
 TEMPERATURE = (69.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 28.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = INCAND LIGHTING-W/SQFT = 1.65  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_PEOPLE  
 SOURCE-SENSIBLE = 0.0 FLOOR-WEIGHT = 130.  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 7.6  
 INF-SCHEDULE = L\_BAY-DOOR ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*BASELINE SIMULATION FOR BLDG. #8300 \*  
 LINE-5 \*VEHICAL MAINT. W/ BAY DOORS OPEN \* ..  
 ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_HEAT\_F =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_COOL\_F =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_HT\_69F =DAY-SCHEDULE (1,24) (69.) ..  
 SD\_FAN\_CYC =DAY-SCHEDULE (1,6) (-1.)  
 (7,17) (0.)  
 (18,24) (-1.) ..  
 SD\_FORC-OFF =DAY-SCHEDULE (1,24) (-1.) ..  
 SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..  
 SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..  
 SW\_HEAT\_F =WEEK-SCHEDULE (ALL) SD\_HEAT\_F ..

SW\_COOL\_F =WEEK-SCHEDULE (ALL) SD\_COOL\_F ..

SW\_HT\_69F =WEEK-SCHEDULE (ALL) SD\_HT\_69F ..

SW\_FAN\_CYC =WEEK-SCHEDULE (WD) SD\_FAN\_CYC  
(WEH) SD\_FORC-OF ..

SW\_FORC\_OF =WEEK-SCHEDULE (ALL) SD\_FORC-OF ..

# \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

# \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

# \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
THRU OCT 1 SW\_OFF  
THRU DEC 31 SW\_ON ..

# \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

# \$ HEATING SET TEMP = 69F

S\_HT\_69F =SCHEDULE THRU DEC 31 SW\_HT\_69F ..

# \$ COOLING SET TEMP =72F

S\_CL\_SET\_F =SCHEDULE THRU DEC 31 SW\_COOL\_F ..

# \$ HEATING SET TEMP =74F

S\_HT\_SET\_F =SCHEDULE THRU DEC 31 SW\_HEAT\_F ..

S\_HRLY-RPT =SCHEDULE THRU JAN 13 SW\_OFF

THRU JAN 15 SW\_ON

THRU AUG 13 SW\_OFF

THRU AUG 15 SW\_ON

THRU DEC 31 SW\_OFF ..

S\_FAN\_CYCL =SCHEDULE THRU MAY 15 SW\_FAN\_CYC

THRU OCT 1 SW\_FORC\_OF

THRU DEC 31 SW\_FAN\_CYC ..

# \$ ZONE DESCRIPTION

BAY-AREA =ZONE DESIGN-HEAT-T = 69.0 DESIGN-COOL-T = 72.0

HEAT-TEMP-SCH = S\_HT\_69F COOL-TEMP-SCH = S\_CL\_SET\_F

ZONE-TYPE = CONDITIONED

THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 12200.

OUTSIDE-AIR-CFM = 12200. SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

```

MAKEUP-AIR =SYSTEM      SYSTEM-TYPE = HVSYS
                        MAX-SUPPLY-T = 120.0  HEATING-SCHEDULE = S_HE-SCHED
                        HEAT-SET-T = 120.0  SUPPLY-CFM = 12200.
                        RATED-CFM = 12200.  MIN-OUTSIDE-AIR = 1.0
                        FAN-SCHEDULE = S_FAN_CYCL  SUPPLY-DELTA-T = 2.4
                        SUPPLY-KW = 0.00078  NIGHT-CYCLE-CTRL = CYCLE-ON-ANY
                        NIGHT-VENT-DT = 0.0  HEATING-CAPACITY = -2000000.
                        HEAT-SOURCE = GAS-FURNACE
                        ZONE-NAMES = (BAY-AREA) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

MAU-BLK  =REPORT-BLOCK VARIABLE-TYPE = MAKEUP-AIR
                VARIABLE-LIST = (3,5,17,1) ..
ZN-BLK   =REPORT-BLOCK VARIABLE-TYPE = BAY-AREA
                VARIABLE-LIST = (17,18,7,6) ..
MAU-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
                REPORT-BLOCK = (MAU-BLK)
..
ZN-HRLY  = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
                REPORT-BLOCK = (ZN-BLK)
..
END ..
COMPUTE SYSTEMS ..

```

INPUT PLANT ..

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *
        LINE-4 *BASELINE SIMULATION FOR BLDG. #8300      *
        LINE-5 *VEHICAL MAINT. W/ BAY DOORS OPEN      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC WARNINGS ..
PLANT-REPORT VERIFICATION=(PV-A)
              SUMMARY=(PS-B,BEPS)
              HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON      =DAY-SCHEDULE (1,24) (1.) ..
PD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

```

PW\_OFF =WEEK-SCHEDULE (ALL) PD\_OFF ..

PW\_ON =WEEK-SCHEDULE (ALL) PD\_ON ..

\$ HEATING SEASON

P\_HEAT =SCHEDULE THRU MAY 15 PW\_ON  
THRU OCT 1 PW\_OFF  
THRU DEC 31 PW\_ON ..

\$ EQUIPMENT DESCRIPTION

RES-FRUNC =PLANT-EQUIPMENT TYPE = FURNACE  
SIZE = -999. ..

PLANT-PARAMETERS BOILER-FUEL = NATURAL-GAS HERM-REC-COND-TYPE = AIR  
CCIRC-HEAD = 0.0 HCIRC-HEAD = 58.0 ..

ENERGY-RESOURCE RESOURCE = ELECTRICITY ..

ENERGY-RESOURCE RESOURCE = NATURAL-GAS ..

END ..

COMPUTE PLANT ..

STOP ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 16:53: 3 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8300 VEHICAL MAINT. W/ BAY DOORS OPEN  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

NUMBER OF EXTERIOR SURFACES 0 RECTANGULAR 0 OTHER 0  
 (U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED )

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 16:53: 3 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8300 VEHICAL MAINT. W/ BAY DOORS OPEN  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

|   |   |   |                         |                          |                                |
|---|---|---|-------------------------|--------------------------|--------------------------------|
| AVERAGE<br>U-VALUE/GLASS<br>(BTU/HR-SQFT-F) | AVERAGE<br>U-VALUE/WALLS<br>(BTU/HR-SQFT-F) | AVERAGE U-VALUE<br>WALLS+GLASS<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | OPAQUE<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) |
|---|---|---|-------------------------|--------------------------|--------------------------------|

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 16:53: 3 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8300 VEHICAL MAINT. W/ BAY DOORS OPEN  
 REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS

\*\*\* BUILDING \*\*\*

FLOOR AREA 8640 SQFT 803 SQMT  
 VOLUME 216000 CUFT 6117 CUMT

TIME DRY-BULB TEMP WET-BULB TEMP  
 SEP 6 4PM 93F 34C  
 76F 24C

|                      | SENSIBLE<br>(KBTU/H) | ( KW )     | LATENT<br>(KBTU/H) | ( KW )  | HEATING LOAD<br>DEC 8 1PM<br>20F -7C<br>17F -8C |
|----------------------|----------------------|------------|--------------------|---------|---|
| WALLS                | 0.000                | 0.000      | 0.000              | 0.000   | 0.000   |
| ROOFS                | 0.000                | 0.000      | 0.000              | 0.000   | 0.000   |
| GLASS CONDUCTION     | 0.000                | 0.000      | 0.000              | 0.000   | 0.000   |
| GLASS SOLAR          | 0.000                | 0.000      | 0.000              | 0.000   | 0.000   |
| DOOR                 | 0.000                | 0.000      | 0.000              | 0.000   | 0.000   |
| INTERNAL SURFACES    | 0.000                | 0.000      | 0.000              | 0.000   | 0.000   |
| UNDERGROUND SURFACES | 0.000                | 0.000      | 0.000              | 0.000   | 0.000   |
| OCCUPANTS TO SPACE   | 8.857                | 2.594      | 17.500             | 5.125   | 8.670   |
| LIGHT TO SPACE       | 36.907               | 10.809     | 0.000              | 0.000   | 35.571  |
| EQUIPMENT TO SPACE   | 0.000                | 0.000      | 0.000              | 0.000   | 0.000   |
| PROCESS TO SPACE     | 0.000                | 0.000      | 0.000              | 0.000   | 0.000   |
| INFILTRATION         | 507.805              | 148.723    | 647.265            | 189.568 | -1265.722                                       |
| TOTAL                | 553.570              | 162.127    | 664.765            | 194.693 | -1221.480                                       |
| TOTAL LOAD           | 1218.334             | KBTU/H     | 356.820            | KW      | -357.741  |
| TOTAL LOAD / AREA    | 141.01               | BTU/H.SQFT | 444.534            | W /SQMT | 445.682   |

\*\*\*\*\*  
 \* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR  
 \* LOADS  
 \* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION  
 \* IN CONSIDERATION  
 \*  
 \*\*\*\*\*





EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/16/1995 16:53: 3 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8300 VEHICAL MAINT. W/ BAY DOORS OPEN  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>16.530<br>81.147<br>31/16 | NATURAL-GAS<br>388.412<br>2590.039<br>14/ 9 |
|-----|--|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 16.530<br>81.147<br>31/16                | 388.412<br>2590.039<br>14/ 9                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 15.476<br>81.147<br>28/16                | 359.130<br>2619.850<br>3/ 7                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 18.722<br>81.147<br>31/16                | 373.408<br>2185.045<br>4/ 7                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 17.212<br>81.147<br>29/16                | 270.243<br>1807.284<br>5/ 7                 |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 13.281<br>81.147<br>13/16                | 115.373<br>1510.531<br>9/ 7                 |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 10.169<br>48.656<br>30/16                | 1.152<br>1.600<br>30/ 1                     |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 9.245<br>48.656<br>29/16                 | 1.190<br>1.600<br>31/ 1                     |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 10.631<br>48.656<br>31/16                | 1.190<br>1.600<br>31/ 1                     |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 9.707<br>48.656<br>30/16                 | 1.152<br>1.600<br>30/ 1                     |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 16.328<br>81.147<br>31/16                | 252.021<br>1970.076<br>20/ 8                |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 16.393<br>81.147<br>30/16                | 310.736<br>2058.549<br>2/ 7                 |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 16.790<br>81.147<br>30/16                | 393.624<br>2511.519<br>13/ 8                |
|     | ONE YEAR<br>USE/PEAK                             | 170.483<br>81.147                        | 2467.633<br>2619.850                        |

EMC ENGINEERS INC. DOE-2.1D 5/16/1995 16:53: 3 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8300 VEHICAL MAINT. W/ BAY DOORS OPEN  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 0.00        | 2460.42     |
| SPACE COOL                                       | 0.00        | 0.00        |
| HVAC AUX   | 54.00       | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 116.48      | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 0.00        | 0.00        |
| TOTAL  | 170.48      | 2460.42     |

TOTAL SITE ENERGY 2638.12 MBTU 251.8 KBTU/SQFT-YR GROSS-AREA 305.3 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2979.59 MBTU 284.4 KBTU/SQFT-YR GROSS-AREA 344.9 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



## \$ SPACE DESCRIPTION

BAY-AREA =SPACE AREA = 8640.0 VOLUME = 216000.0  
 TEMPERATURE = (69.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 28.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = INCAND LIGHTING-W/SQFT = 1.65  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_PEOPLE  
 SOURCE-SENSIBLE = 0.0 FLOOR-WEIGHT = 130.  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 7.6  
 INF-SCHEDULE = L\_BAY-DOOR ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #2 DDC CONTROL FOR BLDG. #8300 \*  
 LINE-5 \*VEHICAL MAINT. W/ BAY DOORS OPEN \* ..  
 ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_HEAT\_F =DAY-SCHEDULE (1,24) (70.) ..  
 SD\_COOL\_F =DAY-SCHEDULE (1,24) (76.) ..  
 SD\_HT\_69F =DAY-SCHEDULE (1,24) (65.) ..  
 SD\_FAN\_CYC =DAY-SCHEDULE (1,6) (-1.) ..  
 (7,17) (0.)  
 (18,24) (-1.) ..  
 SD\_FORC-OFF =DAY-SCHEDULE (1,24) (-1.) ..  
 SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..  
 SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..  
 SW\_HEAT\_F =WEEK-SCHEDULE (ALL) SD\_HEAT\_F ..

```

SW_COOL_F =WEEK-SCHEDULE (ALL) SD_COOL_F ..
SW_HT_69F =WEEK-SCHEDULE (ALL) SD_HT_69F ..
SW_FAN_CYC =WEEK-SCHEDULE (WD) SD_FAN_CYC
              (WEH) SD_FORC-OF ..
SW_FORC_OF =WEEK-SCHEDULE (ALL) SD_FORC-OF ..

```

## \$ FULL ON SYSTEM

```
S_ON =SCHEDULE THRU DEC 31 SW_ON ..
```

## \$ FULL OFF SYSTEM

```
S_OFF =SCHEDULE THRU DEC 31 SW_OFF ..
```

## \$ HEATING SEASON

```

S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT 1 SW_OFF
              THRU DEC 31 SW_ON ..

```

## \$ COOLING SEASON

```

S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT 1 SW_ON
              THRU DEC 31 SW_OFF ..

```

## \$ HEATING SET TEMP = 69F

```
S_HT_69F =SCHEDULE THRU DEC 31 SW_HT_69F ..
```

## \$ COOLING SET TEMP =72F

```
S_CL_SET_F =SCHEDULE THRU DEC 31 SW_COOL_F ..
```

## \$ HEATING SET TEMP =74F

```
S_HT_SET_F =SCHEDULE THRU DEC 31 SW_HEAT_F ..
```

```

S_HRLY-RPT =SCHEDULE THRU JAN 13 SW_OFF
              THRU JAN 15 SW_ON
              THRU AUG 13 SW_OFF
              THRU AUG 15 SW_ON
              THRU DEC 31 SW_OFF ..

```

```

S_FAN_CYCL =SCHEDULE THRU MAY 15 SW_FAN_CYC
              THRU OCT 1 SW_FORC_OF
              THRU DEC 31 SW_FAN_CYC ..

```

## \$ ZONE DESCRIPTION

```

BAY-AREA =ZONE  DESIGN-HEAT-T = 69.0  DESIGN-COOL-T = 72.0
              HEAT-TEMP-SCH = S_HT_69F  COOL-TEMP-SCH = S_CL_SET_F
              ZONE-TYPE = CONDITIONED
              THERMOSTAT-TYPE = PROPORTIONAL  ASSIGNED-CFM = 12200.
              OUTSIDE-AIR-CFM = 12200.  SIZING-OPTION = FROM-LOADS ..

```

## \$ SYSTEM DESCRIPTION

```

MAKEUP-AIR =SYSTEM      SYSTEM-TYPE = HVSYS
                        MAX-SUPPLY-T = 120.0  HEATING-SCHEDULE = S_HE-SCHED
                        HEAT-SET-T = 120.0  SUPPLY-CFM = 12200.
                        RATED-CFM = 12200.  MIN-OUTSIDE-AIR = 1.0
                        FAN-SCHEDULE = S_FAN_CYCL  SUPPLY-DELTA-T = 2.4
                        SUPPLY-KW = 0.00078  NIGHT-CYCLE-CTRL = CYCLE-ON-ANY
                        NIGHT-VENT-DT = 0.0  HEATING-CAPACITY = -2000000.
                        HEAT-SOURCE = GAS-FURNACE
                        ZONE-NAMES = (BAY-AREA) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

MAU-BLK  =REPORT-BLOCK VARIABLE-TYPE = MAKEUP-AIR
                VARIABLE-LIST = (3,5,17,1) ..
ZN-BLK   =REPORT-BLOCK VARIABLE-TYPE = BAY-AREA
                VARIABLE-LIST = (17,18,7,6) ..
MAU-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
                REPORT-BLOCK = (MAU-BLK)
..
ZN-HRLY  = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
                REPORT-BLOCK = (ZN-BLK)
..
END ..
COMPUTE SYSTEMS ..

```

INPUT PLANT ..

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #2 DDC CONTROL FOR BLDG. #8300      *
        LINE-5 *VEHICAL MAINT. W/ BAY DOORS OPEN      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC WARNINGS ..
PLANT-REPORT VERIFICATION=(PV-A)
              SUMMARY=(PS-B,BEPS)
              HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON      =DAY-SCHEDULE (1,24) (1.) ..
PD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

```

| EMC ENGINEERS INC. 80227 E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 8: 5: 7 SDL RUN 1<br>DENVER, CO RUN #2 DDC CONTROL FOR BLDG. #8300 VEHICAL MAINT. W/ BAY DOORS OPEN<br>REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MAKEUP-AIR TOPEKA, KS |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|---|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| MONTH   | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -238.631                    | 14                      | 9                    | -3. F                | -4. F                                   | 4613.                              | 23.766                          |
| FEB   | 0.00000                     |                         |                      |                      | -241.100                    | 3                       | 7                    | -5. F                | -6. F                                   | 4456.                              | 23.766                          |
| MAR   | 0.00000                     |                         |                      |                      | -235.719                    | 3                       | 7                    | 14. F                | 12. F                                   | 5302.                              | 23.766                          |
| APR   | 0.00000                     |                         |                      |                      | -177.816                    | 5                       | 7                    | 30. F                | 27. F                                   | 5003.                              | 23.766                          |
| MAY   | 0.00000                     |                         |                      |                      | -76.496                     | 9                       | 7                    | 43. F                | 43. F                                   | 3890.                              | 23.766                          |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 2978.                              | 14.250                          |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 2708.                              | 14.250                          |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 3114.                              | 14.250                          |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 2843.                              | 14.250                          |
| OCT   | 0.00000                     |                         |                      |                      | -168.874                    | 20                      | 8                    | 23. F                | 22. F                                   | 4772.                              | 23.766                          |
| NOV   | 0.00000                     |                         |                      |                      | -212.357                    | 2                       | 7                    | 19. F                | 17. F                                   | 4792.                              | 23.766                          |
| DEC   | 0.00000                     |                         |                      |                      | -249.456                    | 13                      | 8                    | 0. F                 | -1. F                                   | 4737.                              | 23.766                          |
| TOTAL   | 0.000                       |                         |                      |                      | -1600.447                   |                         |                      |                      |   | 49206.                             | 23.766                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 8: 5: 7 SDL RUN 1<br>DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #8300 VEHICAL MAINT. W/ BAY DOORS OPEN<br>REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MAKEUP-AIR TOPEKA, KS |                          |                          |  |                   |                            |                            |                  |                           |                           |                                      |  |  |
|---|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------|---------------------------|---------------------------|--------------------------------------|--|--|
| - - - - - N U M B E R O F H O U R S - - - - - --COINCIDENT LOADS--  |                          |                          |  |                   |                            |                            |                  |                           |                           |                                      |  |  |
| MONTH   | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON | HOURS<br>FANS<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN   | 0                        | 186                      | 0  | 558               | 744                        | 0                          | 186              | 186                       | 0                         | 0                                    | 0.000  | 0.000  |
| FEB   | 0                        | 198                      | 0  | 474               | 672                        | 0                          | 198              | 198                       | 0                         | 0                                    | 0.000  | 0.000  |
| MAR   | 0                        | 230                      | 0  | 514               | 744                        | 0                          | 230              | 230                       | 0                         | 0                                    | 0.000  | 0.000  |
| APR   | 0                        | 227                      | 0  | 493               | 720                        | 0                          | 227              | 227                       | 0                         | 0                                    | 0.000  | 0.000  |
| MAY   | 0                        | 110                      | 0  | 634               | 360                        | 0                          | 110              | 110                       | 0                         | 0                                    | 0.000  | 0.000  |
| JUN   | 0                        | 0                        | 0  | 720               | 0                          | 0                          | 0                | 0                         | 0                         | 0                                    | 0.000  | 0.000  |
| JUL   | 0                        | 0                        | 0  | 744               | 0                          | 0                          | 0                | 0                         | 0                         | 0                                    | 0.000  | 0.000  |
| AUG   | 0                        | 0                        | 0  | 744               | 0                          | 0                          | 0                | 0                         | 0                         | 0                                    | 0.000  | 0.000  |
| SEP   | 0                        | 0                        | 0  | 720               | 0                          | 0                          | 0                | 0                         | 0                         | 0                                    | 0.000  | 0.000  |
| OCT   | 0                        | 217                      | 0  | 527               | 720                        | 0                          | 217              | 217                       | 0                         | 0                                    | 0.000  | 0.000  |
| NOV   | 0                        | 219                      | 0  | 501               | 720                        | 0                          | 219              | 219                       | 0                         | 0                                    | 0.000  | 0.000  |
| DEC   | 0                        | 199                      | 0  | 545               | 744                        | 0                          | 199              | 199                       | 0                         | 0                                    | 0.000  | 0.000  |
| ANNUAL  | 0                        | 1586                     | 0  | 7174              | 5424                       | 0                          | 1586             | 1586                      | 0                         | 0                                    | 0.000  | 0.000  |



EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 8: 5: 7 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #8300 VEHICAL MAINT. W/ BAY DOORS OPEN  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY -<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>15.750<br>81.147<br>31/16 | NATURAL-GAS<br>338.494<br>2590.039<br>14/ 9 |
|-----|---|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 15.750<br>81.147<br>31/16                | 338.494<br>2590.039<br>14/ 9                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 15.216<br>81.147<br>28/16                | 344.104<br>2619.850<br>3/ 7                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 18.104<br>81.147<br>31/16                | 341.585<br>2178.077<br>3/ 7                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 17.082<br>81.147<br>29/16                | 263.924<br>1807.284<br>5/ 7                 |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 13.281<br>81.147<br>13/16                | 115.373<br>1510.531<br>9/ 7                 |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 10.169<br>48.656<br>30/16                | 1.152<br>1.600<br>30/ 1                     |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 9.245<br>48.656<br>29/16                 | 1.190<br>1.600<br>31/ 1                     |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 10.631<br>48.656<br>31/16                | 1.190<br>1.600<br>31/ 1                     |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 9.707<br>48.656<br>30/16                 | 1.152<br>1.600<br>30/ 1                     |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 16.295<br>81.147<br>31/16                | 250.754<br>1970.076<br>20/ 8                |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 16.360<br>81.147<br>30/16                | 309.055<br>2058.549<br>2/ 7                 |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 16.173<br>81.147<br>30/16                | 354.799<br>2511.519<br>13/ 8                |
|     | ONE YEAR<br>USE/PEAK                              | 168.014<br>81.147                        | 2322.774<br>2619.850                        |

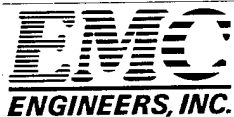
EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 8: 5: 7 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #8300 VEHICAL MAINT. W/ BAY DOORS OPEN  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     |             |             |  |
|-----------------|-------------|-------------|--|
| IN SITE MBTU -  | ELECTRICITY | NATURAL-GAS |  |
| CATEGORY OF USE |             |             |  |
| SPACE HEAT      | 0.00        | 2315.56     |  |
| SPACE COOL      | 0.00        | 0.00        |  |
| HVAC AUX        | 51.53       | 0.00        |  |
| DOM HOT WTR     | 0.00        | 0.00        |  |
| AUX SOLAR       | 0.00        | 0.00        |  |
| LIGHTS          | 116.48      | 0.00        |  |
| VERT TRANS      | 0.00        | 0.00        |  |
| MISC EQUIP      | 0.00        | 0.00        |  |
| TOTAL           | 168.01      | 2315.56     |  |

TOTAL SITE ENERGY 2490.79 MBTU 237.8 KBTU/SQFT-YR GROSS-AREA 288.3 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2827.32 MBTU 269.9 KBTU/SQFT-YR GROSS-AREA 327.2 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

**COMPUTER ENERGY SIMULATIONS**

**BLDG. 8069A/B  
SWIMMING POOL AND GYM BUILDINGS**



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

BUILDING NO.: 8069  
BLDG. TYPE: INDOOR SWIM POOL/GYM - POOL AREA

### ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3 | RUN4 | RUN5 |
|----------------|---------|---------|---------|------|------|------|
| HEATING (MBtu) | 1122.6  | 933.5   | 1048.2  | 0.0  | 0.0  | 0.0  |
| COOLING (KWH)  | 186,338 | 163,712 | 185,502 | 0    | 0    | 0    |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 18,720 CFM                        |
| FLOOR AREA     | 6,600 FT <sup>2</sup>             |
| CFMI           | 9360 CFM                          |
| UA             | 2173 BTU/HR-°F                    |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

| EZDOE COMPUTER RUN DEFINITION: |                             |
|--------------------------------|-----------------------------|
| BASERUN                        | EXISTING OPERATION          |
| RUN1                           | NIGHT SETBACK               |
| RUN2                           | DDC CONTROL                 |
| RUN3                           | ECONOMIZER                  |
| RUN4                           | NIGHTTIME INFILTRATION (OA) |
| RUN5                           | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      |            | ANNUAL HEATING & COOLING HOURS |            |
|--------------------|-------------------|------|------------|--------------------------------|------------|
| M-F                | 600               | 2200 | 80 HR      | HR. ON HEATING                 | 3308 HR/YR |
| SAT.               | 900               | 2000 | 11 HR      | HR. ON COOLING                 | 2011 HR/YR |
| SUN.               | 900               | 2000 | 11 HR      | HR. OFF HEATING                | 2140 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 102 HR/WK  | HR. OFF COOLING                | 1301 HR/YR |
|                    | TOTAL UNOCC. HR.  |      | 66 HR/WK   |                                |            |
|                    | ANNUAL OCCUPY HR. |      | 5319 HR/YR |                                |            |
|                    | ANNUAL UNOCC. HR. |      | 3441 HR/YR |                                |            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING

8760 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY

5448 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

3312 HR/YR

|                      |      |   |      |   |            |
|----------------------|------|---|------|---|------------|
| HRS SAVED (HTG ONLY) | 5448 | - | 3308 | = | 2140 HR/YR |
| HRS SAVED (CLG ONLY) | 3312 | - | 2011 | = | 1301 HR/YR |

|           |   |   |               |   |                     |
|-----------|---|---|---------------|---|---------------------|
| HOAUHC    | 1122.64 MBtu  | - | 0 MBtu        | = | 0.00E+00 Btu/CFM-HR |
|           | 9360 CFM  | x | 3441 HR/YR    |   |                     |
| HOAUH     | 1122.64 MBtu  | - | 0 MBtu        | = | 0.00E+00 Btu/CFM-HR |
|           | 9360 CFM  | x | 2140 HR/YR    |   |                     |
| COAUHC    | 186,337.5 KWH   | - | 0.0 KWH       | = | 0.00E+00 KWH/CFM-HR |
|           | 9360 CFM  | x | 3441 HR/YR    |   |                     |
| COAUC     | 186,337.5 KWH   | - | 0.0 KWH       | = | 0.00E+00 KWH/CFM-HR |
|           | 9360 CFM  | x | 1301 HR/YR    |   |                     |
| HOAOHC    | 1122.64 MBtu  | - | 0 MBtu        | = | 0.00E+00 Btu/CFM-HR |
|           | 9360 CFM  | x | 5319 HR/YR    |   |                     |
| HOAOH     | 1122.64 MBtu  | - | 0 MBtu        | = | 0.00E+00 Btu/CFM-HR |
|           | 9360 CFM  | x | 3308 HR/YR    |   |                     |
| COAOHC    | 186,337.5 KWH   | - | 0.0 KWH       | = | 0.00E+00 KWH/CFM-HR |
|           | 9360 CFM  | x | 5319 HR/YR    |   |                     |
| COAOC     | 186,337.5 KWH   | - | 0.0 KWH       | = | 0.00E+00 KWH/CFM-HR |
|           | 9360 CFM  | x | 2011 HR/YR    |   |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               |   | = 0.17              |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               |   | = 0.17              |
| ECC       | 163,712.3 KWH   | - | 0.0 KWH       | = | 0.00E+00 KWH/CFM-HR |
|           | 18720 CFM   | x | 2011 HR/YR    |   |                     |
| ECHC      | 163,712.3 KWH   | - | 0.0 KWH       | = | 0.00E+00 KWH/CFM-HR |
|           | 18720 CFM   | x | 5319 HR/YR    |   |                     |
| NSUCHC    | 186,337.5 KWH   | - | 163,712.3 KWH | = | 3.51E-04 KWH/CFM-HR |
|           | 18720 CFM   | x | 3441 HR/YR    |   |                     |
| NSUCC     | 186,337.5 KWH   | - | 163,712.3 KWH | = | 9.29E-04 KWH/CFM-HR |
|           | 18720 CFM   | x | 1301 HR/YR    |   |                     |
| DDCCHC    | 186,337.5 KWH   | - | 185,502.5 KWH | = | 8.39E-06 KWH/CFM-HR |
|           | 18720 CFM   | x | 5319 HR/YR    |   |                     |
| DDCCC     | 186,337.5 KWH   | - | 185,502.5 KWH | = | 2.22E-05 KWH/CFM-HR |
|           | 18720 CFM   | x | 2011 HR/YR    |   |                     |
| NSC       | 1122.64 MBtu  | - | 933.45 MBtu   | = | 8.71E+04 Btu/UA     |
|           | 2173.2367 UA  |   |               |   |                     |
| DDCH      | 1122.64 MBtu  | - | 1048.16 MBtu  | = | 3.43E+04 Btu/UA     |
|           | 2173.2367 UA  |   |               |   |                     |
| OPT       | (2 HR/DAY X 240 DAY/YR)                               |   |               |   | = 175 HR/YR         |
|           |   |   |               |   | = 305 HR/YR         |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               |   | = 17.5 KWH/TON      |
| OAR       | 567 HR/YR   | x | 0.01          | = | 5.67 HR/YR          |



INPUT LOADS ..

```

$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

```

```

LINE-4 *BASELINE SIMULATION FOR BLDG. #8069-POOL*
LINE-5 *SWIMMING POOL AREA                      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC WARNINGS ..
LOADS-REPORT VERIFICATION=(LV-A,LV-D)
              SUMMARY=(LS-C,LS-D)
              HOURLY-DATA-SAVE = YES ..
BUILDING-LOCATION LATITUDE = 39.0
                  LONGITUDE = 96.5
                  ALTITUDE = 1065.
                  TIME-ZONE = 6
                  GROSS-AREA = 6600
                  SHIELDING-COEF = 0.29
                  X-REF = 0.0
                  Y-REF = 0.0 ..
RUN-PERIOD   JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

```

LD_POOL-TH =DAY-SCHEDULE (1,7) (0.)
                  (8,11) (0.1)
                  (12,22) (1.)
                  (23,24) (0.) ..

```

```

LD_PL-WKEN =DAY-SCHEDULE (1,8) (0.)
                  (9,20) (1.)
                  (21,24) (0.) ..

```

```

LD_ON      =DAY-SCHEDULE (1,24) (1.) ..

```

```

LD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

```

```

LD_PL-MTWF =DAY-SCHEDULE (1,5) (0.)
                  (6,22) (1.)
                  (23,24) (0.) ..

```

```

LW_ON      =WEEK-SCHEDULE (ALL) LD_ON ..

```

```

LW_OFF     =WEEK-SCHEDULE (ALL) LD_OFF ..

```

LW\_POOL =WEEK-SCHEDULE (MON) LD\_PL-MTWF  
 (TUE) LD\_PL-MTWF  
 (WED) LD\_PL-MTWF  
 (THU) LD\_POOL-TH  
 (FRI) LD\_PL-MTWF  
 (SAT) LD\_PL-WKEN  
 (SUN) LD\_PL-WKEN  
 (HOL) LD\_PL-WKEN ..

\$ ON 100% OF THE TIME

L\_ON =SCHEDULE THRU DEC 31 LW\_ON ..

\$ OFF 100% OF THE TIME

L\_OFF =SCHEDULE THRU DEC 31 LW\_OFF ..

\$ PEOPLE LOAD FOR POOL

L\_POOLAREA =SCHEDULE THRU DEC 31 LW\_POOL ..

#### \$ CONSTRUCTION TYPES

##### \$ EXTERIOR WALL BRICK, INSL, PLASTER

WALL-1 =LAYERS MATERIAL=(BK01,AL11,IN12,IN23,GP03) I-F-R= 0.6100  
 THICKNESS=(0.333,0.000,0.458,0.167,0.063) ..

EXWALL-1 =CONSTRUCTION LAYERS = WALL-1  
 ABSORPTANCE = 0.880  
 ROUGHNESS = 2 ..

FLOOR =CONSTRUCTION U-VALUE = 0.020  
 ABSORPTANCE = 0.610  
 ROUGHNESS = 5 ..

##### \$ BUILT-UP ROOF W/INSL& NO CEILING

BLT-ROOF =LAYERS MATERIAL=(HF-E2,HF-A3,IN61,IN35,IN61,HF-A3)  
 THICKNESS=(0.042,0.005,0.042,0.167,0.042,0.005) ..

ROOF-1 =CONSTRUCTION LAYERS = BLT-ROOF  
 ABSORPTANCE = 0.800  
 ROUGHNESS = 1 ..

##### \$ STANDARD METAL DOOR

DOOR-MET =CONSTRUCTION U-VALUE = 0.020  
 ABSORPTANCE = 0.860  
 ROUGHNESS = 5 ..

2\_PN\_STD =GLASS-TYPE GLASS-TYPE-CODE = 2  
 PANES = 2 ..

#### \$ SPACE DESCRIPTION

```

pool-area =SPACE  AREA = 6600.0  VOLUME = 211200.0
TEMPERATURE = (73.)  ZONE-TYPE = CONDITIONED
PEOPLE-SCHEDULE = L_POOLAREA  NUMBER-OF-PEOPLE = 20.0
PEOPLE-HG-LAT = 1090.0  PEOPLE-HG-SENS = 710.0
LIGHTING-TYPE = INCAND  LIGHTING-W/SQFT = 1.4
LIGHT-TO-SPACE = 1.0  LIGHTING-SCHEDULE = L_POOLAREA
SOURCE-SCHEDULE = L_ON  SOURCE-TYPE = PROCESS
SOURCE-BTU/HR = 198828.0  SOURCE-SENSIBLE = 0.0
SOURCE-LATENT = 1.0  INF-METHOD = AIR-CHANGE
AIR-CHANGES/HR = 0.23  INF-SCHEDULE = L_ON  ..

```

```

E-W  HEIGHT = 32.0  WIDTH = 110.0  CONS = EXWALL-1
      AZIMUTH = 0  SKY-FORM-FACTOR = 0.5
      GND-FORM-FACTOR = 0.5  ..

```

```

WINDOW HEIGHT = 15.0  WIDTH = 110.0  G-T = 2_PN_STD
      SKY-FORM-FACTOR = 0.5  GND-FORM-FACTOR = 0.5  ..

```

```

DOOR  HEIGHT = 7.5  WIDTH = 3.5  CONS = DOOR-MET
      MULTIPLIER = 4.0  SETBACK = 0.2
      SKY-FORM-FACTOR = 0.5  GND-FORM-FACTOR = 0.5  ..

```

```

E-W  HEIGHT = 32.0  WIDTH = 60.0  CONS = EXWALL-1
      AZIMUTH = 90  SKY-FORM-FACTOR = 0.5
      GND-FORM-FACTOR = 0.5  ..

```

```

WINDOW HEIGHT = 10.0  WIDTH = 60.0  G-T = 2_PN_STD
      SKY-FORM-FACTOR = 0.5  GND-FORM-FACTOR = 0.5  ..

```

```

E-W  HEIGHT = 32.0  WIDTH = 60.0  CONS = EXWALL-1
      AZIMUTH = 270  SKY-FORM-FACTOR = 0.5
      GND-FORM-FACTOR = 0.5  ..

```

```

WINDOW HEIGHT = 10.0  WIDTH = 60.0  G-T = 2_PN_STD
      SKY-FORM-FACTOR = 0.5  GND-FORM-FACTOR = 0.5  ..

```

```

ROOF  HEIGHT = 60.0  WIDTH = 110.0  CONS = ROOF-1
      TILT = 0  SKY-FORM-FACTOR = 1.0  ..

```

```

U-W  HEIGHT = 57.0  WIDTH = 55.3  CONS = FLOOR  ..

```

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

\$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *   EMC   ENGINEERS   INC.   *

```



LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*

LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*BASELINE SIMULATION FOR BLDG. #8069-POL\*

LINE-5 \*SWIMMING POOL AREA \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-N,SS-O)  
 HOURLY-DATA-SAVE = YES ..

# \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,24) (82.) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,24) (84.) ..  
 SD\_WT-VENT =DAY-SCHEDULE (1,24) (0.5) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,24) (82.) ..  
 SD\_SM\_HT =DAY-SCHEDULE (1,24) (80.) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..

SW\_WT-VENT =WEEK-SCHEDULE (ALL) SD\_WT-VENT ..

SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..

SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..

# \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

# \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

# \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

# \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

# \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F = SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

## \$ 50%OA IN WT-100% IN SUM

S\_VENT\_SCH = SCHEDULE THRU MAY 15 SW\_WT-VENT  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_WT-VENT ..

## S\_HRLY-RPS = SCHEDULE THRU JAN 13 SW\_OFF

THRU JAN 15 SW\_ON  
 THRU AUG 13 SW\_OFF  
 THRU AUG 15 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ ZONE DESCRIPTION

pool-area = ZONE DESIGN-HEAT-T = 80.0 DESIGN-COOL-T = 81.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 BASEBOARD-RATING = -91000. SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

POOL-H&V'S = SYSTEM SYSTEM-TYPE = HVSYS  
 MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S\_HE-SCHED  
 HEAT-SET-T = 120.0 HEAT-CONTROL = COLDEST  
 OA-CONTROL = FIXED SUPPLY-CFM = 18000.  
 RATED-CFM = 18000. MIN-OUTSIDE-AIR = 0.1  
 MIN-AIR-SCH = S\_VENT\_SCH RECOVERY-EFF = 0.7  
 SUPPLY-DELTA-T = 2.4 SUPPLY-KW = 0.00078  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 HEATING-CAPACITY = -979020. RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (pool-area) ..

## \$ HOURLY REPORT DESCRIPTION

H&V-BLK = REPORT-BLOCK VARIABLE-TYPE = POOL-H&V'S  
 VARIABLE-LIST = (3,5,17,39,1) ..  
 SPACE-BLK = REPORT-BLOCK VARIABLE-TYPE = pool-area  
 VARIABLE-LIST = (17,18,7,6) ..  
 AHU-RPTS = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPS  
 REPORT-BLOCK = (H&V-BLK)  
 ..  
 ZONE-RPTS = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPS  
 REPORT-BLOCK = (SPACE-BLK)  
 ..  
 END ..

COMPUTE SYSTEMS ..

INPUT PLANT ..

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *   EMC       ENGINEERS       INC.       *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *   DENVER,       CO       80227       *

        LINE-4 *BASELINE SIMULATION FOR BLDG. #8069-POOL*
        LINE-5 *SWIMMING POOL AREA               * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
PLANT-REPORT VERIFICATION=(PV-A,PV-B)
            SUMMARY=(BEPS)
            HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON      =DAY-SCHEDULE (1,24) (1.) ..

PD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

PW_OFF     =WEEK-SCHEDULE (ALL) PD_OFF ..

PW_ON      =WEEK-SCHEDULE (ALL) PD_ON ..

```

## \$ HEATING SEASON

```

P_HEAT     =SCHEDULE THRU MAY 15 PW_ON
            THRU OCT 1 PW_OFF
            THRU DEC 31 PW_ON ..

```

## \$ EQUIPMENT DESCRIPTION

```

MAINBOILER =PLANT-EQUIPMENT  TYPE = HW-BOILER
            SIZE = -999. ..

```

```

PLANT-PARAMETERS  BOILER-FUEL = NATURAL-GAS  HERM-REC-COND-TYPE = AIR
                  CCIRC-HEAD = 0.0  HCIRC-HEAD = 58.0 ..

```

```

ENERGY-RESOURCE  RESOURCE = ELECTRICITY ..
ENERGY-RESOURCE  RESOURCE = NATURAL-GAS ..

```

```

HEAT-SEASO =LOAD-ASSIGNMENT  TYPE = HEATING

```

OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000

PLANT-EQUIPMENT = MAINBOILER

NUMBER = 1 ..

END ..

COMPUTE PLANT ..

STOP ..



-----  
EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 13:26:10 LDL RUN 1  
DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8069-POOLS WIMMING POOL AREA  
REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS  
-----

\*\*\* BUILDING \*\*\*

FLOOR AREA 6600 SQFT 613 SQMT  
VOLUME 211200 CUFT 5981 CUMT

TIME DRY-BULB TEMP WET-BULB TEMP  
JUL 23 6PM 95F 35C  
COOLING LOAD 79F 26C  
HEATING LOAD  
JAN 4 3AM 8F -13C  
7F -14C

|                      | SENSIBLE |            | LATENT   |         | SENSIBLE |            |
|----------------------|----------|------------|----------|---------|----------|------------|
|                      | (KBTU/H) | ( KW )     | (KBTU/H) | ( KW )  | (KBTU/H) | ( KW )     |
| WALLS                | 3.296    | 0.965      | 0.000    | 0.000   | -9.624   | -2.819     |
| ROOFS                | 22.895   | 6.705      | 0.000    | 0.000   | -35.393  | -10.366    |
| GLASS CONDUCTION     | 32.167   | 9.421      | 0.000    | 0.000   | -97.286  | -28.492    |
| GLASS SOLAR          | 111.103  | 32.539     | 0.000    | 0.000   | 3.427    | 1.004      |
| DOOR                 | 0.050    | 0.015      | 0.000    | 0.000   | -0.135   | -0.040     |
| INTERNAL SURFACES    | 0.000    | 0.000      | 0.000    | 0.000   | 0.000    | 0.000      |
| UNDERGROUND SURFACES | -0.566   | -0.166     | 0.000    | 0.000   | -1.810   | -0.530     |
| OCCUPANTS TO SPACE   | 13.207   | 3.868      | 21.800   | 6.385   | 2.410    | 0.706      |
| LIGHT TO SPACE       | 28.080   | 8.224      | 0.000    | 0.000   | 8.390    | 2.457      |
| EQUIPMENT TO SPACE   | 0.000    | 0.000      | 0.000    | 0.000   | 0.000    | 0.000      |
| PROCESS TO SPACE     | 0.000    | 0.000      | 198.828  | 58.232  | 0.000    | 0.000      |
| INFILTRATION         | 20.942   | 6.133      | 38.824   | 11.371  | -125.891 | -36.870    |
| TOTAL                | 231.174  | 67.705     | 259.452  | 75.987  | -255.910 | -74.950    |
| TOTAL LOAD           | 490.626  | KBTU/H     | 143.692  | KW      | -255.910 | KBTU/H     |
| TOTAL LOAD / AREA    | 74.34    | BTU/H.SQFT | 234.347  | W /SQMT | 38.774   | BTU/H.SQFT |
|                      |          |            |          |         |          | W /SQMT    |

\*\*\*\*\*  
\* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR \*  
\* LOADS \*  
\* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION \*  
\* IN CONSIDERATION \*  
\*\*\*\*\*

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 13:26:10 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8069-POOLSWIMMING POOL AREA  
 REPORT- LS-D BUILDING MONTHLY LOADS SUMMARY TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.24722                     | 18 16                   | 52. F                | 43. F                | 28.859                                  | -73.182                     | 4 3                     | 8. F                 | 7. F                 | -255.910                                | 4199.                              | 9.236                           |
| FEB   | 1.36480                     | 13 16                   | 58. F                | 48. F                | 59.207                                  | -49.457                     | 1 23                    | 17. F                | 15. F                | -204.686                                | 3774.                              | 9.236                           |
| MAR   | 9.20274                     | 27 17                   | 69. F                | 50. F                | 116.761                                 | -35.871                     | 3 8                     | 15. F                | 12. F                | -205.419                                | 4239.                              | 9.236                           |
| APR   | 30.67085                    | 25 15                   | 83. F                | 66. F                | 176.314                                 | -10.922                     | 4 4                     | 33. F                | 31. F                | -127.729                                | 4088.                              | 9.236                           |
| MAY   | 54.66166                    | 31 17                   | 90. F                | 76. F                | 216.780                                 | -2.452                      | 5 5                     | 44. F                | 40. F                | -81.912                                 | 4199.                              | 9.236                           |
| JUN   | 70.07397                    | 19 18                   | 86. F                | 75. F                | 215.486                                 | -0.435                      | 2 5                     | 50. F                | 49. F                | -34.389                                 | 4082.                              | 9.236                           |
| JUL   | 78.81918                    | 23 17                   | 95. F                | 79. F                | 231.174                                 | -0.004                      | 30 6                    | 62. F                | 59. F                | -4.167                                  | 4153.                              | 9.236                           |
| AUG   | 76.94143                    | 24 17                   | 93. F                | 76. F                | 229.406                                 | -0.080                      | 4 6                     | 54. F                | 53. F                | -16.334                                 | 4291.                              | 9.236                           |
| SEP   | 45.39871                    | 6 16                    | 93. F                | 75. F                | 218.245                                 | -3.801                      | 18 1                    | 50. F                | 48. F                | -70.688                                 | 4036.                              | 9.236                           |
| OCT   | 23.49690                    | 11 16                   | 85. F                | 68. F                | 157.353                                 | -12.606                     | 20 7                    | 23. F                | 22. F                | -117.428                                | 4153.                              | 9.236                           |
| NOV   | 6.46319                     | 7 15                    | 73. F                | 58. F                | 92.995                                  | -31.216                     | 30 5                    | 29. F                | 26. F                | -150.566                                | 4093.                              | 9.236                           |
| DEC   | 0.33447                     | 21 15                   | 55. F                | 44. F                | 26.488                                  | -67.893                     | 15 5                    | 8. F                 | 7. F                 | -211.993                                | 4147.                              | 9.236                           |
| TOTAL | 397.675                     |                         |                      |                      |   | -287.917                    |                         |                      |                      | -255.910                                | 49454.                             |                                 |
| MAX   |                             |                         |                      |                      | 231.174                                 |                             |                         |                      |                      |   |                                    | 9.236                           |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 13:26:10 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8069-POOLSWIMMING POOL AREA  
 REPORT- SV-A SYSTEM DESIGN PARAMETERS POOL-H&V'S TOPEKA, KS

| SYSTEM NAME       |           | ALTITUDE MULTIPLIER        |         |
|-------------------|-----------|----------------------------|---------|
| POOL-H&V'S        |           | 1.040                      |         |
| SUPPLY FAN (CFM ) | 18720.    | ELEC (KW)                  | 14.040  |
| RETURN FAN (CFM ) | 0.        | DELTA-T (F)                | 2.3     |
| EXHAUST FLOW      | 0.        | SUPPLY FLOW                | 18720.  |
| ZONE NAME         | pool-area |                            |         |
|                   |           | COOLING CAPACITY (KBTU/HR) | 0.00    |
|                   |           | HEATING CAPACITY (KBTU/HR) | 0.00    |
|                   |           | EXTRACTION RATE (KBTU/HR)  | 0.00    |
|                   |           | ADDITION RATE (KBTU/HR)    | -855.50 |
|                   |           | MULTIPLIER                 | 1.0     |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 13:26:10 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8069-POLSWIMMING POOL AREA  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR POOL-H&V'S TOPEKA, KS

| MONTH        | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | H E A T I N G           |                      |                      |                           | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                         |        |
|--------------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---------------------------|---|---------------------------------|--------|
|              | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   |                             | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | TRICAL<br>ENERGY<br>(KWH) |   | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |        |
| JAN          | 0.00000                     |                         |                      |                      | 0.000                                   | -179.743                    | 4                       | 3                    | 8. F                 | 7. F                      | -457.224                                | 14645.                          | 23.276 |
| FEB          | 0.00000                     |                         |                      |                      | 0.000                                   | -133.462                    | 3                       | 6                    | -1. F                | -2. F                     | -405.686                                | 13209.                          | 23.276 |
| MAR          | 0.00000                     |                         |                      |                      | 0.000                                   | -105.473                    | 3                       | 8                    | 15. F                | 12. F                     | -386.559                                | 14685.                          | 23.276 |
| APR          | 0.00000                     |                         |                      |                      | 0.000                                   | -38.516                     | 4                       | 5                    | 33. F                | 31. F                     | -252.302                                | 14197.                          | 23.276 |
| MAY          | 0.00000                     |                         |                      |                      | 0.000                                   | -9.581                      | 5                       | 6                    | 44. F                | 40. F                     | -174.766                                | 14645.                          | 23.276 |
| JUN          | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      |                           | 0.000                                   | 14191.                          | 23.276 |
| JUL          | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      |                           | 0.000                                   | 14598.                          | 23.276 |
| AUG          | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      |                           | 0.000                                   | 14737.                          | 23.276 |
| SEP          | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      |                           | 0.000                                   | 14145.                          | 23.276 |
| OCT          | 0.00000                     |                         |                      |                      | 0.000                                   | -42.554                     | 20                      | 8                    | 23. F                | 22. F                     | -263.787                                | 14598.                          | 23.276 |
| NOV          | 0.00000                     |                         |                      |                      | 0.000                                   | -92.569                     | 2                       | 5                    | 16. F                | 15. F                     | -314.650                                | 14202.                          | 23.276 |
| DEC          | 0.00000                     |                         |                      |                      | 0.000                                   | -166.280                    | 15                      | 5                    | 8. F                 | 7. F                      | -409.753                                | 14593.                          | 23.276 |
| TOTAL<br>MAX | 0.000                       |                         |                      |                      | 0.000                                   | -768.179                    |                         |                      |                      |                           | -457.224                                | 172450.                         | 23.276 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 13:26:10 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8069-POLSWIMMING POOL AREA  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR POOL-H&V'S TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |                            |                   |                            |                            |                              |                           |                                      |  | COINCIDENT LOADS--                             |  |  |
|--------|---------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |  |
| JAN    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 0                            | 0                         | 0                                    | -212.828   | 14.040   |  |  |
| FEB    | 0                         | 671                      | 0                          | 1                 | 672                        | 0                          | 0                            | 0                         | 1                                    | -204.907   | 14.040   |  |  |
| MAR    | 0                         | 694                      | 0                          | 50                | 744                        | 0                          | 0                            | 0                         | 50                                   | -202.820   | 14.040   |  |  |
| APR    | 0                         | 435                      | 0                          | 285               | 720                        | 0                          | 0                            | 0                         | 285                                  | -78.394  | 14.040   |  |  |
| MAY    | 0                         | 151                      | 0                          | 593               | 744                        | 0                          | 0                            | 0                         | 593                                  | 0.000  | 14.040   |  |  |
| JUN    | 0                         | 0                        | 0                          | 720               | 720                        | 0                          | 0                            | 0                         | 720                                  | 0.000  | 14.040   |  |  |
| JUL    | 0                         | 0                        | 0                          | 744               | 744                        | 0                          | 0                            | 0                         | 744                                  | 0.000  | 14.040   |  |  |
| AUG    | 0                         | 0                        | 0                          | 744               | 744                        | 0                          | 0                            | 0                         | 744                                  | 0.000  | 14.040   |  |  |
| SEP    | 0                         | 0                        | 0                          | 720               | 720                        | 0                          | 0                            | 0                         | 720                                  | 0.000  | 14.040   |  |  |
| OCT    | 0                         | 483                      | 0                          | 261               | 744                        | 0                          | 0                            | 0                         | 261                                  | -166.305   | 14.040   |  |  |
| NOV    | 0                         | 656                      | 0                          | 64                | 720                        | 0                          | 0                            | 0                         | 64                                   | -248.922   | 14.040   |  |  |
| DEC    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 0                            | 0                         | 0                                    | -238.269   | 14.040   |  |  |
| ANNUAL | 0                         | 4578                     | 0                          | 4182              | 5424                       | 0                          | 8760                         | 0                         | 4182                                 |  |  |  |  |



EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOB-2.1D 6/ 2/1995  
DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8069-POLSWIMMING POOL AREA 13:26:10  
REPORT- SS-K SPACE TEMPERATURE SUMMARY POOL-H&V'S TOPEKA, KS

| MONTH  | A V E R A G E       |                         | S P A C E               |                        | T E M P                 |                     | A V E R A G E                         |                                       | D I F F E R E N C E                              |  | S U M M E D                                      |  | D I F F E R E N C E                              |  | H U M I D I T Y                                  |  |
|--------|---------------------|-------------------------|-------------------------|------------------------|-------------------------|---------------------|---------------------------------------|---------------------------------------|--|--|--|--|--|--|--|--|
|        | ALL<br>HOURS<br>(F) | COOLING<br>HOURS<br>(F) | HEATING<br>HOURS<br>(F) | FAN ON<br>HOURS<br>(F) | FAN OFF<br>HOURS<br>(F) | ALL<br>HOURS<br>(F) | OUTDOOR &<br>ROOM AIR<br>HOURS<br>(F) | OUTDOOR &<br>ROOM AIR<br>HOURS<br>(F) | BETWEEN<br>OUTDOOR &<br>ROOM AIR<br>HOURS<br>(F) | BETWEEN<br>OUTDOOR &<br>ROOM AIR<br>HOURS<br>(F) | BETWEEN<br>OUTDOOR &<br>ROOM AIR<br>HOURS<br>(F) | BETWEEN<br>OUTDOOR &<br>ROOM AIR<br>HOURS<br>(F) | BETWEEN<br>OUTDOOR &<br>ROOM AIR<br>HOURS<br>(F) | BETWEEN<br>OUTDOOR &<br>ROOM AIR<br>HOURS<br>(F) | BETWEEN<br>OUTDOOR &<br>ROOM AIR<br>HOURS<br>(F) | BETWEEN<br>OUTDOOR &<br>ROOM AIR<br>HOURS<br>(F) |
| JAN    | 81.65               |                         | 81.65                   | 81.65                  | 0.00                    | -55.83              |                                       |                                       | -55.83   | 0.00   | 1730.79  | 1730.79  | 1730.79  | -0.00453   |  |  |
| FEB    | 81.89               |                         | 81.89                   | 81.89                  | 0.00                    | -50.21              |                                       |                                       | -50.21   | 0.00   | 1404.89  | 1404.89  | 1405.92  | -0.00454   |  |  |
| MAR    | 82.13               |                         | 82.08                   | 82.13                  | 0.00                    | -41.85              |                                       |                                       | -41.85   | 0.00   | 1253.90  | 1253.90  | 1297.42  | -0.00452   |  |  |
| APR    | 82.82               |                         | 82.36                   | 82.82                  | 0.00                    | -26.05              |                                       |                                       | -26.05   | 0.00   | 579.92   | 579.92   | 781.45   | -0.00453   |  |  |
| MAY    | 79.57               |                         | 82.45                   | 79.57                  | 0.00                    | -13.49              |                                       |                                       | -13.49   | 0.00   | 181.61   | 181.61   | 418.09   | -0.00349   |  |  |
| JUN    | 79.92               |                         |                         | 79.92                  | 0.00                    | -6.28               |                                       |                                       | -6.28  | 0.00   |  |  |  | -0.00243   |  |  |
| JUL    | 83.52               |                         |                         | 83.52                  | 0.00                    | -6.34               |                                       |                                       | -6.34  | 0.00   |  |  |  | -0.00246   |  |  |
| AUG    | 85.00               |                         |                         | 85.00                  | 0.00                    | -5.87               |                                       |                                       | -5.87  | 0.00   |  |  |  | -0.00246   |  |  |
| SEP    | 72.90               |                         |                         | 72.90                  | 0.00                    | -5.36               |                                       |                                       | -5.36  | 0.00   |  |  |  | -0.00235   |  |  |
| OCT    | 82.34               |                         | 82.39                   | 82.34                  | 0.00                    | -24.45              |                                       |                                       | -24.45   | 0.00   | 614.11   | 614.11   | 758.93   | -0.00457   |  |  |
| NOV    | 82.20               |                         | 82.14                   | 82.20                  | 0.00                    | -38.09              |                                       |                                       | -38.09   | 0.00   | 1100.72  | 1100.72  | 1142.80  | -0.00461   |  |  |
| DEC    | 81.81               |                         | 81.81                   | 81.81                  | 0.00                    | -51.77              |                                       |                                       | -51.77   | 0.00   | 1604.97  | 1604.97  | 1604.97  | -0.00450   |  |  |
| ANNUAL | 81.33               | 0.00                    | 82.02                   | 81.33                  | 0.00                    | -27.03              |                                       |                                       | -27.03   | 0.00   | 8470.91  | 8470.91  | 9868.12  | -0.00374   |  |  |

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EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 13:26:10 SDL RUN 1
DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8069-POOLSWIMMING POOL AREA
REPORT- SS-Q TEMPERATURE SCATTER PLOT POOL-H&V'S FOR pool-area TOPEKA, KS
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EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 13:26:10 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8069-POLLSWIMMING POOL AREA  
 REPORT- PV-A EQUIPMENT SIZES TOPEKA, KS

| EQUIPMENT |  |  |  | NUMBER   |          |          |          | NUMBER   |          |          |          | NUMBER   |          |          |          |
|-----------|--|--|--|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
|           |  |  |  | NUMBER   | INSTD    | SIZE     | AVAIL    | NUMBER   | INSTD    | SIZE     | AVAIL    | NUMBER   | INSTD    | SIZE     | AVAIL    |
|           |  |  |  | (MBTU/H) | (MBTU/H) | (MBTU/H) | (MBTU/H) | (MBTU/H) | (MBTU/H) | (MBTU/H) | (MBTU/H) | (MBTU/H) | (MBTU/H) | (MBTU/H) | (MBTU/H) |
| HW-BOILER |  |  |  | 0.460    | 1        | 1        |          |          |          |          |          |          |          |          |          |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 13:26:10 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8069-POLLSWIMMING POOL AREA  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  |  | UTILITY-     |  | ELECTRICITY |  | NATURAL-GAS |  |
|-----|--|--------------|--|-------------|--|-------------|--|
|     |  | TOTAL (MBTU) |  | 58.624      |  | 250.511     |  |
| JAN |  | PEAK (KBTU)  |  | 91.241      |  | 575.402     |  |
|     |  | DY/HR        |  | 31/22       |  | 4/ 3        |  |
| FEB |  | TOTAL (MBTU) |  | 52.702      |  | 192.678     |  |
|     |  | PEAK (KBTU)  |  | 91.241      |  | 520.840     |  |
|     |  | DY/HR        |  | 28/22       |  | 3/ 6        |  |
| MAR |  | TOTAL (MBTU) |  | 57.219      |  | 157.199     |  |
|     |  | PEAK (KBTU)  |  | 91.241      |  | 500.300     |  |
|     |  | DY/HR        |  | 31/22       |  | 3/ 8        |  |
| APR |  | TOTAL (MBTU) |  | 52.007      |  | 61.585      |  |
|     |  | PEAK (KBTU)  |  | 91.241      |  | 351.685     |  |
|     |  | DY/HR        |  | 15/ 8       |  | 4/ 5        |  |
| MAY |  | TOTAL (MBTU) |  | 51.088      |  | 16.187      |  |
|     |  | PEAK (KBTU)  |  | 91.241      |  | 262.319     |  |
|     |  | DY/HR        |  | 9/ 6        |  | 5/ 6        |  |
| JUN |  | TOTAL (MBTU) |  | 48.455      |  | 0.000       |  |
|     |  | PEAK (KBTU)  |  | 79.475      |  | 0.000       |  |
|     |  | DY/HR        |  | 30/22       |  | 30/ 1       |  |
| JUL |  | TOTAL (MBTU) |  | 49.845      |  | 0.000       |  |
|     |  | PEAK (KBTU)  |  | 79.475      |  | 0.000       |  |
|     |  | DY/HR        |  | 31/20       |  | 31/ 1       |  |
| AUG |  | TOTAL (MBTU) |  | 50.318      |  | 0.000       |  |
|     |  | PEAK (KBTU)  |  | 79.475      |  | 0.000       |  |
|     |  | DY/HR        |  | 31/22       |  | 31/ 1       |  |
| SEP |  | TOTAL (MBTU) |  | 48.297      |  | 0.000       |  |
|     |  | PEAK (KBTU)  |  | 79.475      |  | 0.000       |  |
|     |  | DY/HR        |  | 30/22       |  | 30/ 1       |  |
| OCT |  | TOTAL (MBTU) |  | 53.969      |  | 69.190      |  |
|     |  | PEAK (KBTU)  |  | 91.241      |  | 364.703     |  |
|     |  | DY/HR        |  | 31/11       |  | 20/ 8       |  |
| NOV |  | TOTAL (MBTU) |  | 55.132      |  | 140.138     |  |
|     |  | PEAK (KBTU)  |  | 91.241      |  | 421.667     |  |
|     |  | DY/HR        |  | 30/22       |  | 2/ 5        |  |
| DEC |  | TOTAL (MBTU) |  | 58.379      |  | 235.154     |  |
|     |  | PEAK (KBTU)  |  | 91.241      |  | 525.187     |  |
|     |  | DY/HR        |  | 31/20       |  | 15/ 5       |  |
|     |  | ONE YEAR     |  | 636.035     |  | 1122.642    |  |
|     |  | USE/PEAK     |  | 91.241      |  | 575.402     |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 13:26:10 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #8069-POOLSWIMMING POOL AREA  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 39.73       | 1122.64     |
| SPACE COOL      | 0.00        | 0.00        |
| HVAC AUX        | 427.39      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 168.85      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 0.00        | 0.00        |
| TOTAL           | 635.97      | 1122.64     |

TOTAL SITE ENERGY 1758.68 MBTU 266.5 KBTU/SQFT-YR GROSS-AREA 266.5 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 3032.66 MBTU 459.5 KBTU/SQFT-YR GROSS-AREA 459.5 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*

LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #1 NIGHT SETBACK FOR BLDG. 8069-POOL\*

LINE-5 \*SWIMMING POOL AREA \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-N,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,5) (76.)  
 (6,22) (82.)  
 (23,24) (76.) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,5) (78.)  
 (6,22) (84.)  
 (23,24) (78.) ..  
 SD\_WT-VENT =DAY-SCHEDULE (1,24) (0.5) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,5) (88.)  
 (6,22) (82.)  
 (23,24) (88.) ..  
 SD\_SM\_HT =DAY-SCHEDULE (1,5) (86.)  
 (6,22) (80.)  
 (23,24) (86.) ..  
 SD\_FAN\_CYC =DAY-SCHEDULE (1,5) (0.)  
 (6,22) (1.)  
 (23,24) (-1.) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..  
 SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..  
 SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..  
 SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..  
 SW\_WT-VENT =WEEK-SCHEDULE (ALL) SD\_WT-VENT ..  
 SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..  
 SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..  
 SW\_FAN\_CYC =WEEK-SCHEDULE (ALL) SD\_FAN\_CYC ..

## \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

## \$ 50%OA IN WT-100% IN SUM

S\_VENT\_SCH =SCHEDULE THRU MAY 15 SW\_WT-VENT  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_WT-VENT ..

S\_HRLY-RPS =SCHEDULE THRU JAN 13 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU AUG 13 SW\_OFF  
 THRU AUG 15 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

## \$ ZONE DESCRIPTION

pool-area =ZONE DESIGN-HEAT-T = 80.0 DESIGN-COOL-T = 81.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 BASEBOARD-RATING = -91000. SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

POOL-H&V'S =SYSTEM SYSTEM-TYPE = HVSYS  
 MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S\_HE-SCHED  
 HEAT-SET-T = 120.0 HEAT-CONTROL = COLDEST  
 OA-CONTROL = FIXED SUPPLY-CFM = 18000.  
 RATED-CFM = 18000. MIN-OUTSIDE-AIR = 0.1  
 MIN-AIR-SCH = S\_VENT\_SCH RECOVERY-EFF = 0.7  
 FAN-SCHEDULE = S\_FAN\_CYC SUPPLY-DELTA-T = 2.4  
 SUPPLY-KW = 0.00078  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY NIGHT-VENT-DT = 0.0  
 HEATING-CAPACITY = -979020. RETURN-AIR-PATH = DUCT

ZONE-NAMES = (pool-area) ..

\$ HOURLY REPORT DESCRIPTION

H&V-BLK =REPORT-BLOCK VARIABLE-TYPE = POOL-H&V'S  
   VARIABLE-LIST = (3,5,17,39,1) ..  
 SPACE-BLK =REPORT-BLOCK VARIABLE-TYPE = pool-area  
   VARIABLE-LIST = (17,18,7,6) ..  
 AHU-RPTS = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPS  
   REPORT-BLOCK = (H&V-BLK)  
 ..  
 ZONE-RPTS = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPS  
   REPORT-BLOCK = (SPACE-BLK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

\$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #1 NIGHT SETBACK FOR BLDG. 8069-POOL\*  
 LINE-5 \*SWIMMING POOL AREA \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A,PV-B)  
                   SUMMARY=(BEPS)  
                   HOURLY-DATA-SAVE = YES ..

\$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 PD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 PW\_OFF =WEEK-SCHEDULE (ALL) PD\_OFF ..  
 PW\_ON =WEEK-SCHEDULE (ALL) PD\_ON ..

\$ HEATING SEASON

P\_HEAT =SCHEDULE THRU MAY 15 PW\_ON  
                   THRU OCT 1 PW\_OFF  
                   THRU DEC 31 PW\_ON ..

EMC ENGINEERS INC. ED02 - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 13:44:16 SDL RUN 1  
DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 8069-POLSWIMMING POOL AREA  
REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR POOL-H&V'S TOPEKA, KS

| MONTH        | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                           |                                 |
|--------------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------------|---------------------------------|
|              | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | TRICAL<br>ELEC<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN          | 0.00000                     |                         |                      |                      | 0.000                                   | 16                          | 7                       | 12. F                | 9. F                 | -488.035                                | 12890.                            | 23.276                          |
| FEB          | 0.00000                     |                         |                      |                      | 0.000                                   | 2                           | 7                       | 7. F                 | 5. F                 | -439.676                                | 11608.                            | 23.276                          |
| MAR          | 0.00000                     |                         |                      |                      | 0.000                                   | 3                           | 8                       | 15. F                | 12. F                | -445.070                                | 12663.                            | 23.276                          |
| APR          | 0.00000                     |                         |                      |                      | 0.000                                   | 4                           | 6                       | 32. F                | 31. F                | -282.624                                | 12063.                            | 23.276                          |
| MAY          | 0.00000                     |                         |                      |                      | 0.000                                   | 5                           | 6                       | 44. F                | 40. F                | -220.153                                | 13058.                            | 23.276                          |
| JUN          | 0.00000                     |                         |                      |                      | 0.000                                   |                             |                         |                      |                      | 0.000                                   | 12801.                            | 23.276                          |
| JUL          | 0.00000                     |                         |                      |                      | 0.000                                   |                             |                         |                      |                      | 0.000                                   | 13138.                            | 23.276                          |
| AUG          | 0.00000                     |                         |                      |                      | 0.000                                   |                             |                         |                      |                      | 0.000                                   | 13333.                            | 23.276                          |
| SEP          | 0.00000                     |                         |                      |                      | 0.000                                   |                             |                         |                      |                      | 0.000                                   | 13190.                            | 23.276                          |
| OCT          | 0.00000                     |                         |                      |                      | 0.000                                   | 20                          | 8                       | 23. F                | 22. F                | -301.707                                | 12282.                            | 23.276                          |
| NOV          | 0.00000                     |                         |                      |                      | 0.000                                   | 2                           | 6                       | 15. F                | 14. F                | -356.580                                | 12181.                            | 23.276                          |
| DEC          | 0.00000                     |                         |                      |                      | 0.000                                   | 15                          | 7                       | 11. F                | 9. F                 | -464.017                                | 12824.                            | 23.276                          |
| TOTAL<br>TAX | 0.000                       |                         |                      |                      | 0.000                                   |                             |                         |                      |                      | -488.035                                | 152029.                           | 23.276                          |

EMC ENGINEERS INC. E2BOE - ELITE SOFTWARE DEVELOPMENT INC DOF-2.1D 6/ 2/1995 13:44:16 SDL RUN 1  
DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 8069-POOLSWIMMING POOL AREA  
REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR POOL-H&V'S TOPEKA, KS

|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | N U M B E R O F | H O U R S | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | --COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
|--------|--------------------------|--------------------------|--|-----------------|-----------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|---|
| JAN    | 0                        | 619                      | 0  | 125             | 744       | 0                          | 619                        | 92                           | 0                         | 0                                    | 0.000   |
| FEB    | 0                        | 558                      | 0  | 114             | 672       | 0                          | 558                        | 82                           | 0                         | 0                                    | 0.000   |
| MAR    | 0                        | 569                      | 0  | 175             | 744       | 0                          | 600                        | 73                           | 0                         | 31                                   | 0.000   |
| APR    | 0                        | 297                      | 0  | 423             | 720       | 0                          | 568                        | 58                           | 0                         | 271                                  | 14.040  |
| MAY    | 0                        | 88                       | 0  | 656             | 360       | 0                          | 631                        | 104                          | 0                         | 543                                  | 0.000   |
| JUN    | 0                        | 0                        | 0  | 720             | 0         | 0                          | 621                        | 111                          | 0                         | 621                                  | 14.040  |
| JUL    | 0                        | 0                        | 0  | 744             | 0         | 0                          | 640                        | 113                          | 0                         | 640                                  | 14.040  |
| AUG    | 0                        | 0                        | 0  | 744             | 0         | 0                          | 644                        | 117                          | 0                         | 644                                  | 14.040  |
| SEP    | 0                        | 0                        | 0  | 720             | 0         | 0                          | 652                        | 142                          | 0                         | 652                                  | 14.040  |
| OCT    | 0                        | 332                      | 0  | 412             | 720       | 0                          | 579                        | 52                           | 0                         | 247                                  | 0.000   |
| NOV    | 0                        | 529                      | 0  | 191             | 720       | 0                          | 576                        | 66                           | 0                         | 47                                   | 0.000   |
| DEC    | 0                        | 618                      | 0  | 126             | 744       | 0                          | 618                        | 91                           | 0                         | 0                                    | 0.000   |
| ANNUAL | 0                        | 3610                     | 0  | 5150            | 5424      | 0                          | 7306                       | 1101                         | 0                         | 3696                                 |   |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 13:44:16 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 8069-POOLSWIMMING POOL AREA  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>51.690<br>92.034<br>31/22 | NATURAL-GAS<br>216.995<br>614.175<br>16/ 7 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 46.386<br>92.034<br>28/22                | 165.353<br>563.045<br>2/ 7                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 49.217<br>92.034<br>31/22                | 128.666<br>568.795<br>3/ 8                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 43.685<br>92.034<br>16/ 9                | 43.370<br>390.479<br>4/ 6                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 45.248<br>92.034<br>9/ 7                 | 10.110<br>319.067<br>5/ 6                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 43.709<br>79.475<br>30/22                | 0.000<br>0.000<br>30/ 1                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 44.859<br>79.475<br>31/20                | 0.000<br>0.000<br>31/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 45.524<br>79.475<br>31/22                | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 45.037<br>79.475<br>30/22                | 0.000<br>0.000<br>30/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 44.852<br>92.034<br>31/12                | 50.043<br>411.978<br>20/ 8                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 47.200<br>92.034<br>30/22                | 115.069<br>472.981<br>2/ 6                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 51.381<br>92.034<br>31/20                | 203.845<br>588.899<br>15/ 7                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |  |  |
|     | ONE YEAR<br>USE/PEAK                             | 558.787<br>92.034                        | 933.452<br>614.175                         |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 13:44:16 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 8069-POLSWIMMING POOL AREA  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU - | ELECTRICITY | NATURAL-GAS |
|-------------------------------|-------------|-------------|
| CATEGORY OF USE               |             |             |
| SPACE HEAT                    | 33.37       | 933.45      |
| SPACE COOL                    | 0.00        | 0.00        |
| HVAC AUX                      | 356.52      | 0.00        |
| DOM HOT WTR                   | 0.00        | 0.00        |
| AUX SOLAR                     | 0.00        | 0.00        |
| LIGHTS                        | 168.85      | 0.00        |
| VERT TRANS                    | 0.00        | 0.00        |
| MISC EQUIP                    | 0.00        | 0.00        |
| TOTAL                         | 558.75      | 933.45      |

TOTAL SITE ENERGY 1492.24 MBTU 226.1 KBTU/SQFT-YR GROSS-AREA 226.1 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2611.49 MBTU 395.7 KBTU/SQFT-YR GROSS-AREA 395.7 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*

LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #2 DDC CONTROL FOR BLDG. #8069-PPOOL \*

LINE-5 \*SWIMMING POOL AREA \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-N,SS-O)  
 HOURLY-DATA-SAVE = YES ..

# \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..

SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

SD\_WT\_HT =DAY-SCHEDULE (1,24) (80.) ..

SD\_WT\_CL =DAY-SCHEDULE (1,24) (82.) ..

SD\_WT-VENT =DAY-SCHEDULE (1,24) (0.5) ..

SD\_SM\_CL =DAY-SCHEDULE (1,24) (84.) ..

SD\_SM\_HT =DAY-SCHEDULE (1,24) (82.) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..

SW\_WT-VENT =WEEK-SCHEDULE (ALL) SD\_WT-VENT ..

SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..

SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..

# \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

# \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

# \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

# \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

# \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F = SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

## \$ 50%OA IN WT-100% IN SUM

S\_VENT\_SCH = SCHEDULE THRU MAY 15 SW\_WT-VENT  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_WT-VENT ..

## S\_HRLY-RPS = SCHEDULE THRU JAN 13 SW\_OFF

THRU JAN 15 SW\_ON  
 THRU AUG 13 SW\_OFF  
 THRU AUG 15 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ ZONE DESCRIPTION

pool-area = ZONE DESIGN-HEAT-T = 80.0 DESIGN-COOL-T = 81.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 BASEBOARD-RATING = -91000. SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

POOL-H&V'S = SYSTEM SYSTEM-TYPE = HVSYS  
 MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S\_HE-SCHED  
 HEAT-SET-T = 120.0 HEAT-CONTROL = COLDEST  
 OA-CONTROL = FIXED SUPPLY-CFM = 18000.  
 RATED-CFM = 18000. MIN-OUTSIDE-AIR = 0.1  
 MIN-AIR-SCH = S\_VENT\_SCH RECOVERY-EFF = 0.7  
 SUPPLY-DELTA-T = 2.4 SUPPLY-KW = 0.00078  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 HEATING-CAPACITY = -979020. RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (pool-area) ..

## \$ HOURLY REPORT DESCRIPTION

H&V-BLK = REPORT-BLOCK VARIABLE-TYPE = POOL-H&V'S  
 VARIABLE-LIST = (3,5,17,39,1) ..  
 SPACE-BLK = REPORT-BLOCK VARIABLE-TYPE = pool-area  
 VARIABLE-LIST = (17,18,7,6) ..  
 AHU-RPTS = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPS  
 REPORT-BLOCK = (H&V-BLK)  
 ..  
 ZONE-RPTS = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPS  
 REPORT-BLOCK = (SPACE-BLK)  
 ..  
 END ..



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC. DOE-2.1D 6/ 2/1995 13:50: 1 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #8069-POOL SWIMMING POOL AREA  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

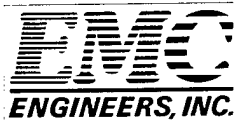
| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>58.322<br>90.896<br>31/22 | NATURAL-GAS<br>239.504<br>558.534<br>4/ 3 |
|-----|--|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 58.322<br>90.896<br>31/22                | 239.504<br>558.534<br>4/ 3                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.399<br>90.896<br>28/22                | 182.406<br>507.067<br>3/ 6                |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 56.770<br>90.896<br>31/22                | 145.759<br>483.936<br>3/ 8                |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 51.557<br>90.896<br>15/ 8                | 53.428<br>334.922<br>4/ 5                 |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 50.914<br>90.407<br>9/ 6                 | 13.357<br>246.518<br>5/ 6                 |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 48.455<br>79.475<br>30/22                | 0.000<br>0.000<br>30/ 1                   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 49.845<br>79.475<br>31/20                | 0.000<br>0.000<br>31/ 1                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 50.318<br>79.475<br>31/22                | 0.000<br>0.000<br>31/ 1                   |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 48.297<br>79.475<br>30/22                | 0.000<br>0.000<br>30/ 1                   |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 53.496<br>90.896<br>31/11                | 60.281<br>350.973<br>20/ 8                |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 54.706<br>90.896<br>30/22                | 129.610<br>407.520<br>2/ 5                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 58.069<br>90.896<br>31/20                | 223.818<br>509.986<br>15/ 5               |
|     | ONE YEAR<br>USE/PEAK                             | 633.148<br>90.896                        | 1048.161<br>558.534                       |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 13:50: 1 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #8069-POOL SWIMMING POOL AREA  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 37.26       | 1048.16     |
| SPACE COOL      | 0.00        | 0.00        |
| HVAC AUX        | 427.01      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 168.86      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 0.00        | 0.00        |
| TOTAL           | 633.12      | 1048.16     |

TOTAL SITE ENERGY 1681.31 MBTU 254.7 KBTU/SQFT-YR GROSS-AREA 254.7 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2949.51 MBTU 446.9 KBTU/SQFT-YR GROSS-AREA 446.9 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.





DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

BUILDING NO.: 8069  
BLDG. TYPE: INDOOR SWIM POOL/GYM - GYM & LOCKERS

### ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3    | RUN4    | RUN5    |
|----------------|---------|---------|---------|---------|---------|---------|
| HEATING (MBtu) | 3150.3  | 2080.6  | 3122.5  | 2085.1  | 2070.7  | 935.5   |
| COOLING (kWH)  | 514,439 | 417,987 | 511,096 | 416,045 | 503,475 | 483,270 |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 44,000 CFM                        |
| FLOOR AREA     | 21,862 FT <sup>2</sup>            |
| CFM1           | 14990 CFM                         |
| UA             | 2515 BTU/HR.°F                    |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

| EZDOE COMPUTER RUN DEFINITION: |                             |
|--------------------------------|-----------------------------|
| BASERUN                        | EXISTING OPERATION          |
| RUN1                           | NIGHT SETBACK               |
| RUN2                           | DDC CONTROL                 |
| RUN3                           | ECONOMIZER                  |
| RUN4                           | NIGHTTIME INFILTRATION (OA) |
| RUN5                           | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      | ANNUAL HEATING & COOLING HOURS |                            |
|--------------------|-------------------|------|--------------------------------|----------------------------|
| M-F                | 600               | 2200 | 80 HR                          | HR. ON HEATING 3308 HR/YR  |
| SAT.               | 900               | 2000 | 11 HR                          | HR. ON COOLING 2011 HR/YR  |
| SUN.               | 900               | 2000 | 11 HR                          | HR. OFF HEATING 2140 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 102 HR/WK                      | HR. OFF COOLING 1301 HR/YR |
|                    | TOTAL UNOCC. HR.  |      | 66 HR/WK                       |                            |
|                    | ANNUAL OCCUPY HR. |      | 5319 HR/YR                     |                            |
|                    | ANNUAL UNOCC. HR. |      | 3441 HR/YR                     |                            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5448 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3312 HR/YR  
HRS SAVED (HTG ONLY) 5448 - 3308 = 2140 HR/YR  
HRS SAVED (CLG ONLY) 3312 - 2011 = 1301 HR/YR

|           |   |   |               |   |                     |
|-----------|---|---|---------------|---|---------------------|
| HOAUHC    | 3150.25 MBtu  | - | 2070.71 MBtu  | = | 2.09E+01 Btu/CFM-HR |
|           | 14990 CFM   | x | 3441 HR/YR    |   |                     |
| HOAUH     | 3150.25 MBtu  | - | 2070.71 MBtu  | = | 3.36E+01 Btu/CFM-HR |
|           | 14990 CFM   | x | 2140 HR/YR    |   |                     |
| COAUHC    | 514,438.9 kWH   | - | 503,474.9 kWH | = | 2.13E-04 kWH/CFM-HR |
|           | 14990 CFM   | x | 3441 HR/YR    |   |                     |
| COAUC     | 514,438.9 kWH   | - | 503,474.9 kWH | = | 5.62E-04 kWH/CFM-HR |
|           | 14990 CFM   | x | 1301 HR/YR    |   |                     |
| HOAOHC    | 3150.25 MBtu  | - | 935.52 MBtu   | = | 2.78E+01 Btu/CFM-HR |
|           | 14990 CFM   | x | 5319 HR/YR    |   |                     |
| HOAOH     | 3150.25 MBtu  | - | 935.52 MBtu   | = | 4.47E+01 Btu/CFM-HR |
|           | 14990 CFM   | x | 3308 HR/YR    |   |                     |
| COAOHC    | 514,438.9 kWH   | - | 483,269.9 kWH | = | 3.91E-04 kWH/CFM-HR |
|           | 14990 CFM   | x | 5319 HR/YR    |   |                     |
| COAOC     | 514,438.9 kWH   | - | 483,269.9 kWH | = | 1.03E-03 kWH/CFM-HR |
|           | 14990 CFM   | x | 2011 HR/YR    |   |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               |   | = 0.17              |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               |   | = 0.17              |
| ECC       | 417,987.1 kWH   | - | 416,044.5 kWH | = | 2.20E-05 kWH/CFM-HR |
|           | 44000 CFM   | x | 2011 HR/YR    |   |                     |
| ECHC      | 417,987.1 kWH   | - | 416,044.5 kWH | = | 8.30E-06 kWH/CFM-HR |
|           | 44000 CFM   | x | 5319 HR/YR    |   |                     |
| NSUCHC    | 514,438.9 kWH   | - | 417,987.1 kWH | = | 6.37E-04 kWH/CFM-HR |
|           | 44000 CFM   | x | 3441 HR/YR    |   |                     |
| NSUCC     | 514,438.9 kWH   | - | 417,987.1 kWH | = | 1.68E-03 kWH/CFM-HR |
|           | 44000 CFM   | x | 1301 HR/YR    |   |                     |
| DDCCHC    | 514,438.9 kWH   | - | 511,095.8 kWH | = | 1.43E-05 kWH/CFM-HR |
|           | 44000 CFM   | x | 5319 HR/YR    |   |                     |
| DDCCC     | 514,438.9 kWH   | - | 511,095.8 kWH | = | 3.78E-05 kWH/CFM-HR |
|           | 44000 CFM   | x | 2011 HR/YR    |   |                     |
| NSC       | 3150.25 MBtu  | - | 2080.63 MBtu  | = | 4.25E+05 Btu/UA     |
|           | 2515.224 UA   |   |               |   |                     |
| DDCH      | 3150.25 MBtu  | - | 3122.49 MBtu  | = | 1.10E+04 Btu/UA     |
|           | 2515.224 UA   |   |               |   |                     |
| OPT       | (2 HR/DAY X 240 DAY/YR) - 175 HR/YR                   |   |               |   | = 305 HR/YR         |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               |   | = 17.5 kWH/TON      |
| OAR       | 567 HR/YR   | x | 0.01          | = | 5.67 HR/YR          |





INPUT LOADS ..

\$-----\$  
\$ E Z - D O E L O A D S I N P U T \$  
\$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*  
  
LINE-4 \*BASELINE SIMULATION FOR BLDG. 8069-REMAI\*  
LINE-5 \*THE REMAINDER OF THE BLDG. (LESS POOL) \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
LOADS-REPORT VERIFICATION=(LV-D)  
SUMMARY=(LS-C,LS-D)  
HOURLY-DATA-SAVE = YES ..  
BUILDING-LOCATION LATITUDE = 39.0  
LONGITUDE = 96.5  
ALTITUDE = 1065.  
TIME-ZONE = 6  
GROSS-AREA = 21862  
SHIELDING-COEF = 0.29  
X-REF = 0.0  
Y-REF = 0.0 ..  
RUN-PERIOD JAN 1 1994 THRU DEC 31 1994 ..

## \$ SCHEDULES

LD\_TH\_LITE =DAY-SCHEDULE (1,7) (0.)  
(8,11) (0.5)  
(12,22) (1.)  
(23,24) (0.) ..

LD\_WKEN-LT =DAY-SCHEDULE (1,8) (0.)  
(9,20) (1.)  
(21,24) (0.) ..

LD\_ON =DAY-SCHEDULE (1,24) (1.) ..

LD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

LD\_LT-MTWF =DAY-SCHEDULE (1,5) (0.)  
(6,22) (1.)  
(23,24) (0.) ..

LW\_ON =WEEK-SCHEDULE (ALL) LD\_ON ..

LW\_OFF =WEEK-SCHEDULE (ALL) LD\_OFF ..

LW\_PEOP/LT =WEEK-SCHEDULE (MON) LD\_LT-MTWF  
 (TUE) LD\_LT-MTWF  
 (WED) LD\_LT-MTWF  
 (THU) LD\_TH\_LITE  
 (FRI) LD\_LT-MTWF  
 (SAT) LD\_WKEN-LT  
 (SUN) LD\_WKEN-LT  
 (HOL) LD\_WKEN-LT ..

## \$ ON 100% OF THE TIME

L\_ON =SCHEDULE THRU DEC 31 LW\_ON ..

## \$ OFF 100% OF THE TIME

L\_OFF =SCHEDULE THRU DEC 31 LW\_OFF ..

## \$ PEOPLE LOAD

L\_PEOPLE =SCHEDULE THRU DEC 31 LW\_PEOP/LT ..

## \$ CONSTRUCTION TYPES

## \$ EXTERIOR WALL BRICK, INSL, PLASTER

WALL-1 =LAYERS MATERIAL=(BK01,AL11,IN12,IN23,GP03) I-F-R= 0.6100  
 THICKNESS=(0.333,0.000,0.458,0.167,0.063) ..

EXWALL-1 =CONSTRUCTION LAYERS = WALL-1  
 ABSORPTANCE = 0.880  
 ROUGHNESS = 2 ..

FLOOR =CONSTRUCTION U-VALUE = 0.020  
 ABSORPTANCE = 0.610  
 ROUGHNESS = 5 ..

## \$ BUILT-UP ROOF W/INSL&amp; NO CEILING

BLT-ROOF =LAYERS MATERIAL=(HF-E2,HF-A3,IN61,IN45,IN61,HF-A3)  
 THICKNESS=(0.042,0.005,0.042,0.167,0.042,0.005) ..

ROOF-1 =CONSTRUCTION LAYERS = BLT-ROOF  
 ABSORPTANCE = 0.800  
 ROUGHNESS = 1 ..

## \$ STANDARD METAL DOOR

DOOR-MET =CONSTRUCTION U-VALUE = 0.020  
 ABSORPTANCE = 0.860  
 ROUGHNESS = 5 ..

2\_PN\_STD =GLASS-TYPE GLASS-TYPE-CODE = 2  
 PANES = 2 ..

## \$ SPACE DESCRIPTION

B-BALL/1ST =SPACE AREA = 15141.0 VOLUME = 383733.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 336.0  
 PEOPLE-HG-LAT = 1090.0 PEOPLE-HG-SENS = 710.0  
 LIGHTING-TYPE = INCAND LIGHTING-KW = 22.55  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_PEOPLE  
 SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.5  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.06  
 INF-SCHEDULE = L\_ON ..

E-W HEIGHT = 14.0 WIDTH = 56.0 CONS = EXWALL-1  
 AZIMUTH = 90 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 9.0 WIDTH = 32.0 G-T = 2\_PN\_STD  
 SETBACK = 0.2 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 25.0 WIDTH = 91.0 CONS = EXWALL-1  
 AZIMUTH = 90 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 27.5 WIDTH = 111.0 CONS = EXWALL-1  
 AZIMUTH = 180 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 6.0 WIDTH = 2.5 G-T = 2\_PN\_STD  
 MULTIPLIER = 4.0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 14.0 WIDTH = 56.0 CONS = EXWALL-1  
 AZIMUTH = 270 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 25.0 WIDTH = 91.0 CONS = EXWALL-1  
 AZIMUTH = 270 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 8.0 WIDTH = 91.0 CONS = FLOOR  
 AZIMUTH = 270 ..

U-W HEIGHT = 8.0 WIDTH = 90.0 CONS = FLOOR  
 AZIMUTH = 90 ..

U-W HEIGHT = 8.0 WIDTH = 94.0 CONS = FLOOR  
 AZIMUTH = 180 ..

U-W HEIGHT = 123.0 WIDTH = 123.0 CONS = FLOOR ..

ROOF HEIGHT = 123.0 WIDTH = 123.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

H-BALL/2ND =SPACE AREA = 6721.0 VOLUME = 105873.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED

PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 336.0  
 PEOPLE-HG-LAT = 965.0 PEOPLE-HG-SENS = 635.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.3  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_PEOPLE  
 SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.5  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.06  
 INF-SCHEDULE = L\_ON ..

E-W HEIGHT = 19.0 WIDTH = 56.0 CONS = EXWALL-1  
 AZIMUTH = 90 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 9.0 WIDTH = 35.0 G-T = 2\_PN\_STD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 7.0 WIDTH = 13.0 G-T = 2\_PN\_STD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 20.0 WIDTH = 19.0 CONS = EXWALL-1  
 AZIMUTH = 180 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 19.0 WIDTH = 41.0 CONS = EXWALL-1  
 AZIMUTH = 270 INSIDE-VIS-REFL = 0.2 ..

U-W HEIGHT = 41.0 WIDTH = 41.0 CONS = FLOOR ..

ROOF HEIGHT = 82.0 WIDTH = 82.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

U-W HEIGHT = 8.0 WIDTH = 9.0 CONS = FLOOR  
 AZIMUTH = 180 ..

U-W HEIGHT = 8.0 WIDTH = 9.0 CONS = FLOOR  
 AZIMUTH = 180 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*BASELINE SIMULATION FOR BLDG. 8069-REMAI\*  
 LINE-5 \*THE REMAINDER OF THE BLDG. (LESS POOL) \* ..  
 ABORT ERRORS ..

DIAGNOSTIC            WARNINGS ..  
 SYSTEMS-REPORT      VERIFICATION=(SV-A)  
                      SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
                      HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON        =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF      =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT    =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_SM\_CL    =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_WINT\_OA =DAY-SCHEDULE (1,24) (0.37) ..  
 SD\_WT\_CL    =DAY-SCHEDULE (1,24) (76.) ..  
 SD\_SM\_HT    =DAY-SCHEDULE (1,24) (70.) ..  
  
 SW\_ON        =WEEK-SCHEDULE (ALL) SD\_ON ..  
  
 SW\_OFF       =WEEK-SCHEDULE (ALL) SD\_OFF ..  
  
 SW\_WT\_HT     =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..  
  
 SW\_SM\_CL     =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..  
  
 SW\_WINT\_OA   =WEEK-SCHEDULE (ALL) SD\_WINT\_OA ..  
  
 SW\_WT\_CL     =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..  
  
 SW\_SM\_HT     =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..

## \$ FULL ON SYSTEM

S\_ON        =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF       =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
                          THRU OCT 1 SW\_OFF  
                          THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
                          THRU OCT 1 SW\_ON  
                          THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
                          THRU OCT 1 SW\_SM\_HT  
                          THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
                          THRU OCT 1 SW\_SM\_CL  
                          THRU DEC 31 SW\_WT\_CL ..

## \$ OUTSIDE AIR SCHEDULE

S\_OA\_SCHED =SCHEDULE THRU MAY 15 SW\_WINT\_OA  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_WINT\_OA ..

S\_HRLY-RPT =SCHEDULE THRU JAN 13 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU JUL 21 SW\_OFF  
 THRU JUL 23 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ ZONE DESCRIPTION

B-BALL/1ST =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

H-BALL/2ND =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

H&VSYSTEMS =SYSTEM SYSTEM-TYPE = HVSYS  
 MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S\_HE-SCHED  
 OA-CONTROL = FIXED SUPPLY-CFM = 35000.  
 RATED-CFM = 35000. MIN-OUTSIDE-AIR = 0.37  
 MIN-AIR-SCH = S\_OA\_SCHED SUPPLY-DELTA-T = 2.4  
 SUPPLY-KW = 0.00078  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 HEATING-CAPACITY = -1291523.  
 ZONE-NAMES = (B-BALL/1ST) ..

AHU'S\_1&2 =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED OA-CONTROL = FIXED  
 SUPPLY-CFM = 7315. RATED-CFM = 7315.  
 MIN-OUTSIDE-AIR = 0.2 SUPPLY-DELTA-T = 1.8  
 SUPPLY-KW = 0.00059  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 FAN-PLACEMENT = BLOW-THROUGH  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 COOLING-CAPACITY = 171850. COOL-SH-CAP = 144543.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -100648.  
 MIN-HP-T = 0. MAX-HP-SUPP-T = 0. DEFROST-T = 0.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER SIZING-OPTION = COINCIDENT

ZONE-NAMES = (H-BALL/2ND) ..

\$ HOURLY REPORT DESCRIPTION

H&V-BLK =REPORT-BLOCK VARIABLE-TYPE = H&VSYSTEMS  
           VARIABLE-LIST = (3,5,17,39) ..  
 SZ-AHU-BLK =REPORT-BLOCK VARIABLE-TYPE = AHU'S\_1&2  
           VARIABLE-LIST = (3,5,6,17,39) ..  
 H&VZN-BLK =REPORT-BLOCK VARIABLE-TYPE = B-BALL/1ST  
           VARIABLE-LIST = (17,18,7,6) ..  
 SZZONE-BLK =REPORT-BLOCK VARIABLE-TYPE = H-BALL/2ND  
           VARIABLE-LIST = (17,18,7,6) ..  
 AHU-RPTS = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
           REPORT-BLOCK = (H&V-BLK,SZ-AHU-BLK)  
 ..  
 ZONE-RPTS = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
           REPORT-BLOCK = (H&VZN-BLK,SZZONE-BLK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

\$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*BASELINE SIMULATION FOR BLDG. 8069-REMAI\*  
 LINE-5 \*THE REMAINDER OF THE BLDG. (LESS POOL) \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
               SUMMARY=(PS-B,BEPS)  
               HOURLY-DATA-SAVE = YES ..

\$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 PD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 PW\_ON =WEEK-SCHEDULE (ALL) PD\_ON ..  
 PW\_OFF =WEEK-SCHEDULE (ALL) PD\_OFF ..



## \$ HEATING SEASON

P\_HEAT =SCHEDULE THRU MAY 15 PW\_ON  
THRU OCT 1 PW\_OFF  
THRU DEC 31 PW\_ON ..

## \$ COOLING SEASON

P\_COOL =SCHEDULE THRU MAY 15 PW\_OFF  
THRU OCT 1 PW\_ON  
THRU DEC 31 PW\_OFF ..

## \$ EQUIPMENT DESCRIPTION

BOIL-HW =PLANT-EQUIPMENT TYPE = HW-BOILER  
SIZE = -999. ..

DX\_CHILLER =PLANT-EQUIPMENT TYPE = HERM-REC-CHLR  
SIZE = -999. INSTALLED-NUMBER = 2  
MAX-NUMBER-AVAIL = 2 ..

PLANT-PARAMETERS BOILER-FUEL = NATURAL-GAS HERM-REC-COND-TYPE = AIR  
CCIRC-HEAD = 0.0 HCIRC-HEAD = 58.0 ..

ENERGY-RESOURCE RESOURCE = ELECTRICITY ..  
ENERGY-RESOURCE RESOURCE = NATURAL-GAS ..

HEAT\_SEASO =LOAD-ASSIGNMENT TYPE = HEATING  
OPERATION-MODE = RUN-NEEDED  
  
LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = BOIL-HW  
NUMBER = 1 ..

COOL\_SEASO =LOAD-ASSIGNMENT TYPE = COOLING  
OPERATION-MODE = RUN-NEEDED  
  
LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = DX\_CHILLER  
NUMBER = 2 ..

END ..

COMPUTE PLANT ..

STOP ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 10:48:10 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 8069-REMAITHE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

NUMBER OF EXTERIOR SURFACES 10 RECTANGULAR 10 OTHER 0  
 (U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED )

| SURFACE    | SPACE | - - - G L A S S - - - |        | - - - W A L L - - - |          | - - - A R E A - - - |          | - - - W A L L + G L A S S - - |          | - - - A R E A - - - |          | AZIMUTH   |
|------------|-------|-----------------------|--------|---------------------|----------|---------------------|----------|-------------------------------|----------|---------------------|----------|-----------|
|            |       | U-VALUE               | AREA   | U-VALUE             | AREA     | (BTU/HR-SQFT-F)     | (SQFT)   | (BTU/HR-SQFT-F)               | AREA     | (SQFT)              | (SQFT)   |           |
| B-BALL/1ST |       | 0.490                 | 288.00 | 0.037               | 496.00   | 0.203               | 784.00   | 0.203                         | 784.00   | 0.203               | 784.00   | EAST      |
| B-BALL/1ST |       | 0.000                 | 0.00   | 0.037               | 2275.00  | 0.037               | 2275.00  | 0.037                         | 2275.00  | 0.037               | 2275.00  | EAST      |
| H-BALL/2ND |       | 0.490                 | 406.00 | 0.037               | 658.00   | 0.210               | 1064.00  | 0.210                         | 1064.00  | 0.210               | 1064.00  | EAST      |
| B-BALL/1ST |       | 0.490                 | 60.00  | 0.037               | 2992.50  | 0.046               | 3052.50  | 0.046                         | 3052.50  | 0.046               | 3052.50  | SOUTH     |
| H-BALL/2ND |       | 0.000                 | 0.00   | 0.037               | 380.00   | 0.037               | 380.00   | 0.037                         | 380.00   | 0.037               | 380.00   | SOUTH     |
| B-BALL/1ST |       | 0.000                 | 0.00   | 0.037               | 784.00   | 0.037               | 784.00   | 0.037                         | 784.00   | 0.037               | 784.00   | WEST      |
| B-BALL/1ST |       | 0.000                 | 0.00   | 0.037               | 2275.00  | 0.037               | 2275.00  | 0.037                         | 2275.00  | 0.037               | 2275.00  | WEST      |
| H-BALL/2ND |       | 0.000                 | 0.00   | 0.037               | 779.00   | 0.037               | 779.00   | 0.037                         | 779.00   | 0.037               | 779.00   | WEST      |
| B-BALL/1ST |       | 0.000                 | 0.00   | 0.062               | 15129.00 | 0.062               | 15129.00 | 0.062                         | 15129.00 | 0.062               | 15129.00 | ROOF      |
| H-BALL/2ND |       | 0.000                 | 0.00   | 0.062               | 6724.00  | 0.062               | 6724.00  | 0.062                         | 6724.00  | 0.062               | 6724.00  | ROOF      |
| B-BALL/1ST |       | 0.000                 | 0.00   | 0.020               | 728.00   | 0.020               | 728.00   | 0.020                         | 728.00   | 0.020               | 728.00   | UNDERGRND |
| H-BALL/2ND |       | 0.000                 | 0.00   | 0.020               | 720.00   | 0.020               | 720.00   | 0.020                         | 720.00   | 0.020               | 720.00   | UNDERGRND |
| B-BALL/1ST |       | 0.000                 | 0.00   | 0.020               | 752.00   | 0.020               | 752.00   | 0.020                         | 752.00   | 0.020               | 752.00   | UNDERGRND |
| H-BALL/2ND |       | 0.000                 | 0.00   | 0.020               | 15129.00 | 0.020               | 15129.00 | 0.020                         | 15129.00 | 0.020               | 15129.00 | UNDERGRND |
| B-BALL/1ST |       | 0.000                 | 0.00   | 0.020               | 1681.00  | 0.020               | 1681.00  | 0.020                         | 1681.00  | 0.020               | 1681.00  | UNDERGRND |
| H-BALL/2ND |       | 0.000                 | 0.00   | 0.020               | 72.00    | 0.020               | 72.00    | 0.020                         | 72.00    | 0.020               | 72.00    | UNDERGRND |
| B-BALL/1ST |       | 0.000                 | 0.00   | 0.020               | 72.00    | 0.020               | 72.00    | 0.020                         | 72.00    | 0.020               | 72.00    | UNDERGRND |
| H-BALL/2ND |       | 0.000                 | 0.00   | 0.020               | 72.00    | 0.020               | 72.00    | 0.020                         | 72.00    | 0.020               | 72.00    | UNDERGRND |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 10:48:10 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 8069-REMAITHE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

|             | AVERAGE         | AVERAGE         | AVERAGE             | GLASS  | OPAQUE   | GLASS+OPAQUE |
|-------------|-----------------|-----------------|---------------------|--------|----------|--------------|
|             | U-VALUE/GLASS   | U-VALUE/WALLS   | U-VALUE/WALLS+GLASS | AREA   | AREA     | AREA         |
|             | (BTU/HR-SQFT-F) | (BTU/HR-SQFT-F) | (BTU/HR-SQFT-F)     | (SQFT) | (SQFT)   | (SQFT)       |
| EAST        | 0.490           | 0.037           | 0.113               | 694.00 | 3429.00  | 4123.00      |
| SOUTH       | 0.490           | 0.037           | 0.045               | 60.00  | 3372.50  | 3432.50      |
| WEST        | 0.000           | 0.037           | 0.037               | 0.00   | 3838.00  | 3838.00      |
| ROOF        | 0.000           | 0.062           | 0.062               | 0.00   | 21853.00 | 21853.00     |
| ALL WALLS   | 0.490           | 0.037           | 0.067               | 754.00 | 10639.50 | 11393.50     |
| WALLS+ROOFS | 0.490           | 0.054           | 0.064               | 754.00 | 32492.50 | 33246.50     |
| UNDERGRND   | 0.000           | 0.020           | 0.020               | 0.00   | 19154.00 | 19154.00     |
| BUILDING    | 0.490           | 0.041           | 0.048               | 754.00 | 51646.50 | 52400.50     |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 10:48:10 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 8069-REMAITHE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS

\*\*\* BUILDING \*\*\*

FLOOR AREA 21862 SQFT 2031 SQMT  
 VOLUME 489606 CUFT 13866 CUMT

HEATING LOAD  
 JAN 16 6AM  
 10F -12C  
 8F -13C

COOLING LOAD  
 AUG 4 5PM  
 92F 33C  
 70F 21C

TIME  
 DRY-BULB TEMP  
 WET-BULB TEMP

|                      | SENSIBLE |            | LATENT   |         | SENSIBLE |            |
|----------------------|----------|------------|----------|---------|----------|------------|
|                      | (KBTU/H) | ( KW )     | (KBTU/H) | ( KW )  | (KBTU/H) | ( KW )     |
| WALLS                | 4.454    | 1.304      | 0.000    | 0.000   | -27.560  | -8.072     |
| ROOFS                | 94.872   | 27.786     | 0.000    | 0.000   | -94.240  | -27.601    |
| GLASS CONDUCTION     | 4.254    | 1.246      | 0.000    | 0.000   | -26.221  | -7.680     |
| GLASS SOLAR          | 36.088   | 10.569     | 0.000    | 0.000   | 1.949    | 0.571      |
| DOOR                 | 0.000    | 0.000      | 0.000    | 0.000   | 0.000    | 0.000      |
| INTERNAL SURFACES    | 0.000    | 0.000      | 0.000    | 0.000   | 0.000    | 0.000      |
| UNDERGROUND SURFACES | -1.812   | -0.531     | 0.000    | 0.000   | -10.999  | -3.221     |
| OCCUPANTS TO SPACE   | 40.200   | 11.773     | 68.421   | 20.039  | 3.484    | 1.020      |
| LIGHT TO SPACE       | 90.227   | 26.425     | 0.000    | 0.000   | 12.828   | 3.757      |
| EQUIPMENT TO SPACE   | 0.000    | 0.000      | 0.000    | 0.000   | 0.000    | 0.000      |
| PROCESS TO SPACE     | 0.000    | 0.000      | 0.000    | 0.000   | 0.000    | 0.000      |
| INFILTRATION         | 2.203    | 0.645      | 1.028    | 0.301   | -51.829  | -15.179    |
| TOTAL                | 270.485  | 79.218     | 69.449   | 20.340  | -192.588 | -56.404    |
| TOTAL LOAD           | 339.934  | KBTU/H     | 99.558   | KW      | -192.588 | KBTU/H     |
| TOTAL LOAD / AREA    | 15.55    | BTU/H.SQFT | 49.018   | W /SQMT | 8.809    | BTU/H.SQFT |

\*\*\*\*\*  
 \* NOTE 1)THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR \*  
 \* LOADS \*  
 \* 2)TIMES GIVEN IN STANDARD TIME FOR THE LOCATION \*  
 \* IN CONSIDERATION \*  
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| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 10:48:10 SDL RUN 1  |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
|---|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
| DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 8069-REMAITHE REMAINDER OF THE BLDG. (LESS POOL) |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR H&VSYSTEMS TOPEKA, KS                             |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
| MONTH   | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                           |                                 |
|   | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -468.267                    | 15                      | -8.F                 | -9.F                 | -1224.438                               | 30702.                    | 49.841                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -356.345                    | 3                       | -5.F                 | -6.F                 | -1153.788                               | 27700.                    | 49.841                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -292.756                    | 3                       | 14.F                 | 12.F                 | -853.747                                | 30838.                    | 49.841                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -107.186                    | 5                       | 31.F                 | 29.F                 | -559.830                                | 29777.                    | 49.841                          |
| MAY   | 0.00000                     |                         |                      |                      | 0.000                                   | -29.284                     | 1                       | 37.F                 | 37.F                 | -447.491                                | 30702.                    | 49.841                          |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 29799.                    | 49.841                          |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 30590.                    | 49.841                          |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 30928.                    | 49.841                          |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 29687.                    | 49.841                          |
| OCT   | 0.00000                     |                         |                      |                      | 0.000                                   | -99.992                     | 20                      | 23.F                 | 23.F                 | -681.072                                | 30590.                    | 49.841                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -240.469                    | 3                       | 13.F                 | 12.F                 | -838.546                                | 29754.                    | 49.841                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -418.510                    | 13                      | 0.F                  | -1.F                 | -1047.523                               | 30612.                    | 49.841                          |
| TOTAL   | 0.000                       |                         |                      |                      |   | -2012.813                   |                         |                      |                      |   | 361697.                   |                                 |
| MAX   |                             |                         |                      |                      | 0.000                                   |                             |                         |                      |                      | -1224.438                               |                           | 49.841                          |

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 10:48:10 SDL RUN 1  |  |  |  |  |  |  |  |  |  |  |  |
|---|--|--|--|--|--|--|--|--|--|--|--|
| DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 8069-REMAITHE REMAINDER OF THE BLDG. (LESS POOL) |  |  |  |  |  |  |  |  |  |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR H&VSYSTEMS TOPEKA, KS                                |  |  |  |  |  |  |  |  |  |  |  |
| -----   |  |  |  |  |  |  |  |  |  |  |  |
| HOURS OF HOURS  |  |  |  |  |  |  |  |  |  |  |  |
| N U M B E R   |  |  |  |  |  |  |  |  |  |  |  |
| HOURS   |  |  |  |  |  |  |  |  |  |  |  |
| COINCIDENT  |  |  |  |  |  |  |  |  |  |  |  |
| COOL-HEAT   |  |  |  |  |  |  |  |  |  |  |  |
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EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOB-2.1D 5/17/1995 10:48:10 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 8069-REMAITHE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AHU'S 1&2 TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -34.512                     | 14 23                   | -4.F                 | -5.F                 | -102.496                                | 7242.                              | 13.149                          |
| FEB   | 0.00000                     |                         |                      |                      | -22.984                     | 3 6                     | -1.F                 | -2.F                 | -101.768                                | 6525.                              | 13.049                          |
| MAR   | 0.00000                     |                         |                      |                      | -13.446                     | 3 7                     | 14.F                 | 12.F                 | -87.053                                 | 7290.                              | 13.049                          |
| APR   | 0.00000                     |                         |                      |                      | -1.490                      | 5 5                     | 31.F                 | 29.F                 | -42.874                                 | 7029.                              | 13.049                          |
| MAY   | 27.48898                    | 16 12                   | 73.F                 | 65.F                 | -0.320                      | 14 21                   | 70.F                 | 65.F                 | -6.851                                  | 9718.                              | 29.238                          |
| JUN   | 60.99599                    | 28 16                   | 90.F                 | 76.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 12794.                             | 29.476                          |
| JUL   | 72.79348                    | 13 13                   | 90.F                 | 79.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 14180.                             | 31.586                          |
| AUG   | 70.88877                    | 23 16                   | 96.F                 | 77.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 14364.                             | 30.811                          |
| SEP   | 42.73195                    | 7 15                    | 92.F                 | 76.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 10969.                             | 29.725                          |
| OCT   | 0.97947                     | 1 18                    | 83.F                 | 68.F                 | -1.476                      | 20 7                    | 23.F                 | 23.F                 | -44.764                                 | 7287.                              | 23.073                          |
| NOV   | 0.00000                     |                         |                      |                      | -11.390                     | 3 6                     | 13.F                 | 12.F                 | -79.333                                 | 7020.                              | 13.049                          |
| DEC   | 0.00000                     |                         |                      |                      | -30.091                     | 12 5                    | 4.F                  | 3.F                  | -101.208                                | 7202.                              | 13.149                          |
| TOTAL | 275.879                     |                         |                      |                      | -115.709                    |                         |                      |                      | -102.496                                | 111612.                            | 31.586                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOB-2.1D 5/17/1995 10:48:10 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 8069-REMAITHE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AHU'S 1&2 TOPEKA, KS

| MONTH  | HOURS           |                 |                   |                    | HOURS    |                   |                   |                   | HOURS            |                    |               |                  | HOURS                      |                            |                               |                               | HOURS                      |                            |                               |                               | HOURS                      |                            |                               |                               |
|--------|-----------------|-----------------|-------------------|--------------------|----------|-------------------|-------------------|-------------------|------------------|--------------------|---------------|------------------|----------------------------|----------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|-------------------------------|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | COINCIDENT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON<br>CYCLE | FANS ON<br>VENTING | NIGHT<br>WHEN | FLOATING<br>WHEN | HEATING<br>LOAD AT<br>PEAK | COOLING<br>LOAD AT<br>PEAK | COINCIDENT<br>LOAD AT<br>PEAK | COINCIDENT<br>LOAD AT<br>PEAK | HEATING<br>LOAD AT<br>PEAK | COOLING<br>LOAD AT<br>PEAK | COINCIDENT<br>LOAD AT<br>PEAK | COINCIDENT<br>LOAD AT<br>PEAK | HEATING<br>LOAD AT<br>PEAK | COOLING<br>LOAD AT<br>PEAK | COINCIDENT<br>LOAD AT<br>PEAK | COINCIDENT<br>LOAD AT<br>PEAK |
| JAN    | 0               | 709             | 0                 | 0                  | 35       | 744               | 0                 | 0                 | 0                | 0                  | 0             | 0                | -40.270                    | 4.316                      | 4.316                         | 4.316                         | -40.270                    | 4.316                      | 4.316                         | 4.316                         | -40.270                    | 4.316                      | 4.316                         | 4.316                         |
| FEB    | 0               | 621             | 0                 | 0                  | 51       | 672               | 0                 | 0                 | 0                | 0                  | 0             | 0                | -34.614                    | 4.316                      | 4.316                         | 4.316                         | -34.614                    | 4.316                      | 4.316                         | 4.316                         | -34.614                    | 4.316                      | 4.316                         | 4.316                         |
| MAR    | 0               | 549             | 0                 | 0                  | 195      | 744               | 0                 | 0                 | 0                | 0                  | 0             | 0                | -38.900                    | 4.316                      | 4.316                         | 4.316                         | -38.900                    | 4.316                      | 4.316                         | 4.316                         | -38.900                    | 4.316                      | 4.316                         | 4.316                         |
| APR    | 0               | 359             | 0                 | 0                  | 361      | 720               | 0                 | 0                 | 0                | 0                  | 0             | 0                | -2.657                     | 4.316                      | 4.316                         | 4.316                         | -2.657                     | 4.316                      | 4.316                         | 4.316                         | -2.657                     | 4.316                      | 4.316                         | 4.316                         |
| MAY    | 377             | 169             | 0                 | 0                  | 198      | 360               | 378               | 712               | 720              | 720                | 0             | 0                | 0.000                      | 28.466                     | 28.466                        | 28.466                        | 0.000                      | 28.466                     | 28.466                        | 28.466                        | 0.000                      | 28.466                     | 28.466                        | 28.466                        |
| JUN    | 711             | 0               | 0                 | 0                  | 9        | 0                 | 744               | 744               | 744              | 744                | 0             | 0                | 0.000                      | 29.476                     | 29.476                        | 29.476                        | 0.000                      | 29.476                     | 29.476                        | 29.476                        | 0.000                      | 29.476                     | 29.476                        | 29.476                        |
| JUL    | 744             | 0               | 0                 | 0                  | 0        | 0                 | 744               | 744               | 744              | 744                | 0             | 0                | 0.000                      | 30.433                     | 30.433                        | 30.433                        | 0.000                      | 30.433                     | 30.433                        | 30.433                        | 0.000                      | 30.433                     | 30.433                        | 30.433                        |
| AUG    | 743             | 0               | 0                 | 0                  | 1        | 0                 | 744               | 744               | 744              | 744                | 0             | 0                | 0.000                      | 29.640                     | 29.640                        | 29.640                        | 0.000                      | 29.640                     | 29.640                        | 29.640                        | 0.000                      | 29.640                     | 29.640                        | 29.640                        |
| SEP    | 632             | 0               | 0                 | 0                  | 88       | 0                 | 635               | 720               | 720              | 720                | 0             | 0                | 0.000                      | 22.898                     | 22.898                        | 22.898                        | 0.000                      | 22.898                     | 22.898                        | 22.898                        | 0.000                      | 22.898                     | 22.898                        | 22.898                        |
| OCT    | 15              | 384             | 0                 | 0                  | 345      | 720               | 15                | 744               | 744              | 744                | 0             | 0                | 0.000                      | 4.316                      | 4.316                         | 4.316                         | 0.000                      | 4.316                      | 4.316                         | 4.316                         | 0.000                      | 4.316                      | 4.316                         | 4.316                         |
| NOV    | 0               | 523             | 0                 | 0                  | 197      | 720               | 0                 | 744               | 744              | 744                | 0             | 0                | -54.350                    | 4.316                      | 4.316                         | 4.316                         | -54.350                    | 4.316                      | 4.316                         | 4.316                         | -54.350                    | 4.316                      | 4.316                         | 4.316                         |
| DEC    | 0               | 701             | 0                 | 0                  | 43       | 744               | 0                 | 0                 | 0                | 0                  | 0             | 0                | -58.440                    | 4.316                      | 4.316                         | 4.316                         | -58.440                    | 4.316                      | 4.316                         | 4.316                         | -58.440                    | 4.316                      | 4.316                         | 4.316                         |
| ANNUAL | 3222            | 4015            | 0                 | 0                  | 1523     | 5424              | 3228              | 8760              | 0                | 0                  | 0             | 0                | 1523                       |                            |                               |                               |                            |                            |                               |                               |                            |                            |                               |                               |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 10:48:10 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 8069-REMAITHE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY -<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>154.560<br>249.190<br>28/ 9 | NATURAL-GAS<br>705.446<br>1668.341<br>15/ 5 |
|-----|---|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 139.172<br>248.849<br>28/22                | 551.450<br>1593.961<br>3/ 7                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 151.987<br>248.849<br>31/22                | 462.732<br>1254.135<br>3/ 7                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 137.229<br>248.849<br>16/ 9                | 179.667<br>872.121<br>5/ 5                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 141.993<br>270.009<br>31/18                | 51.878<br>694.043<br>1/ 6                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 145.431<br>270.822<br>28/16                | 0.000<br>0.000<br>30/ 1                     |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 152.864<br>278.026<br>23/16                | 0.000<br>0.000<br>31/ 1                     |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 154.645<br>275.378<br>23/16                | 0.000<br>0.000<br>31/ 1                     |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 138.814<br>271.671<br>7/16                 | 0.000<br>0.000<br>30/ 1                     |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 140.852<br>248.958<br>1/17                 | 171.168<br>1013.214<br>20/ 7                |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 144.486<br>248.849<br>30/22                | 384.863<br>1228.773<br>3/ 6                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 153.834<br>249.190<br>13/ 8                | 643.049<br>1459.380<br>13/ 8                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              |  |   |
|     | ONE YEAR<br>USE/PEAK                              | 1755.867<br>278.026                        | 3150.252<br>1668.341                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 10:48:10 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 8069-REMAITHE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 116.04      | 3150.25     |
| SPACE COOL      | 89.92       | 0.00        |
| HVAC AUX        | 969.36      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 580.46      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 0.00        | 0.00        |
| TOTAL           | 1755.78     | 3150.25     |

TOTAL SITE ENERGY 4906.12 MBTU 224.4 KBTU/SQFT-YR GROSS-AREA 224.4 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 8423.13 MBTU 385.3 KBTU/SQFT-YR GROSS-AREA 385.3 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.4  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 336.0  
 PEOPLE-HG-LAT = 965.0 PEOPLE-HG-SENS = 635.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.3  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_PEOPLE  
 SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.5  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.06  
 INF-SCHEDULE = L\_ON ..

E-W HEIGHT = 19.0 WIDTH = 56.0 CONS = EXWALL-1  
 AZIMUTH = 90 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 9.0 WIDTH = 35.0 G-T = 2\_PN\_STD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 7.0 WIDTH = 13.0 G-T = 2\_PN\_STD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 20.0 WIDTH = 19.0 CONS = EXWALL-1  
 AZIMUTH = 180 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 19.0 WIDTH = 41.0 CONS = EXWALL-1  
 AZIMUTH = 270 INSIDE-VIS-REFL = 0.2 ..

U-W HEIGHT = 41.0 WIDTH = 41.0 CONS = FLOOR ..

ROOF HEIGHT = 82.0 WIDTH = 82.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

U-W HEIGHT = 8.0 WIDTH = 9.0 CONS = FLOOR  
 AZIMUTH = 180 ..

U-W HEIGHT = 8.0 WIDTH = 9.0 CONS = FLOOR  
 AZIMUTH = 180 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #1 NIGHT SETBACK BLDG. 8069-REMAI \*  
 LINE-5 \*THE REMAINDER OF THE BLDG. (LESS POOL) \* ..

ABORT

ERRORS ..



DIAGNOSTIC            WARNINGS ..  
 SYSTEMS-REPORT      VERIFICATION=(SV-A)  
                      SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
                      HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON        =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF      =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT    =DAY-SCHEDULE (1,5) (55.)  
                              (6,22) (74.)  
                              (23,24) (55.) ..  
 SD\_SM\_CL    =DAY-SCHEDULE (1,5) (85.)  
                              (6,22) (72.)  
                              (23,24) (85.) ..  
 SD\_WINT\_OA =DAY-SCHEDULE (1,24) (0.37) ..  
 SD\_WT\_CL    =DAY-SCHEDULE (1,5) (57.)  
                              (6,22) (76.)  
                              (23,24) (57.) ..  
 SD\_SM\_HT    =DAY-SCHEDULE (1,5) (83.)  
                              (6,22) (70.)  
                              (23,24) (83.) ..  
 SD\_FAN\_CYC =DAY-SCHEDULE (1,5) (0.)  
                              (6,22) (1.)  
                              (23,24) (0.) ..

SW\_ON        =WEEK-SCHEDULE (ALL) SD\_ON ..  
 SW\_OFF      =WEEK-SCHEDULE (ALL) SD\_OFF ..  
 SW\_WT\_HT    =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..  
 SW\_SM\_CL    =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..  
 SW\_WINT\_OA =WEEK-SCHEDULE (ALL) SD\_WINT\_OA ..  
 SW\_WT\_CL    =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..  
 SW\_SM\_HT    =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..  
 SW\_FAN\_CYC =WEEK-SCHEDULE (ALL) SD\_FAN\_CYC ..

## \$ FULL ON SYSTEM

S\_ON        =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF       =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
                              THRU OCT 1 SW\_OFF  
                              THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF

THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

## \$ OUTSIDE AIR SCHEDULE

S\_OA\_SCHED =SCHEDULE THRU MAY 15 SW\_WINT\_OA  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_WINT\_OA ..

S\_HRLY-RPT =SCHEDULE THRU JAN 13 SW\_OFF  
THRU JAN 15 SW\_ON  
THRU JUL 21 SW\_OFF  
THRU JUL 23 SW\_ON  
THRU DEC 31 SW\_OFF ..

S\_FAN\_CYCL =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

## \$ ZONE DESCRIPTION

B-BALL/1ST =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

H-BALL/2ND =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

H&VSYSTEMS =SYSTEM SYSTEM-TYPE = HVSYS  
MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S\_HE-SCHED  
OA-CONTROL = FIXED SUPPLY-CFM = 35000.  
RATED-CFM = 35000. MIN-OUTSIDE-AIR = 0.37  
MIN-AIR-SCH = S\_OA\_SCHED FAN-SCHEDULE = S\_FAN\_CYCL  
SUPPLY-DELTA-T = 2.4 SUPPLY-KW = 0.00078  
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
HEATING-CAPACITY = -1291523.  
ZONE-NAMES = (B-BALL/1ST) ..

AHU'S\_1&2 =SYSTEM      SYSTEM-TYPE = PSZ  
                          MAX-SUPPLY-T = 120.0   MIN-SUPPLY-T = 55.0  
                          HEATING-SCHEDULE = S\_HE-SCHED  
                          COOLING-SCHEDULE = S\_CL\_SCHED   OA-CONTROL = FIXED  
                          SUPPLY-CFM = 7315.   RATED-CFM = 7315.  
                          MIN-OUTSIDE-AIR = 0.2   FAN-SCHEDULE = S\_FAN\_CYCL  
                          SUPPLY-DELTA-T = 1.8   SUPPLY-KW = 0.00059  
                          MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
                          FAN-PLACEMENT = BLOW-THROUGH  
                          NIGHT-CYCLE-CTRL = STAY-OFF   NIGHT-VENT-DT = 0.0  
                          COOLING-CAPACITY = 171850.   COOL-SH-CAP = 144543.  
                          COOL-FT-MIN = 0.   HEATING-CAPACITY = -100648.  
                          MIN-HP-T = 0.   MAX-HP-SUPP-T = 0.   DEFROST-T = 0.  
                          CRANKCASE-MAX-T = 0.   OUTSIDE-FAN-T = 45.  
                          HEAT-SOURCE = HOT-WATER   SIZING-OPTION = COINCIDENT  
                          ZONE-NAMES = (H-BALL/2ND)   ..

## \$ HOURLY REPORT DESCRIPTION

H&V-BLK      =REPORT-BLOCK VARIABLE-TYPE = H&VSYSTEMS  
                          VARIABLE-LIST = (3,5,17,39) ..  
 SZ-AHU-BLK =REPORT-BLOCK VARIABLE-TYPE = AHU'S\_1&2  
                          VARIABLE-LIST = (3,5,6,17,39) ..  
 H&VZN-BLK =REPORT-BLOCK VARIABLE-TYPE = B-BALL/1ST  
                          VARIABLE-LIST = (17,18,7,6) ..  
 SZZONE-BLK =REPORT-BLOCK VARIABLE-TYPE = H-BALL/2ND  
                          VARIABLE-LIST = (17,18,7,6) ..  
 AHU-RPTS    = HOURLY-REPORT   REPORT-SCHEDULE = S\_HRLY-RPT  
                          REPORT-BLOCK = (H&V-BLK,SZ-AHU-BLK)  
 ..  
 ZONE-RPTS   = HOURLY-REPORT   REPORT-SCHEDULE = S\_HRLY-RPT  
                          REPORT-BLOCK = (H&VZN-BLK,SZZONE-BLK)  
 ..  
 END   ..  
 COMPUTE SYSTEMS   ..  
 INPUT PLANT   ..

\$-----\$  
 \$ E Z - D O E   P L A N T S   I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE   LINE-1 \*      EMC      ENGINEERS      INC.      \*  
          LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
          LINE-3 \*      DENVER,      CO      80227      \*  
          LINE-4 \*RUN #1 NIGHT SETBACK BLDG. 8069-REMAI      \*  
          LINE-5 \*THE REMAINDER OF THE BLDG. (LESS POOL)      \* ..

ABORT                      ERRORS   ..  
 DIAGNOSTIC                WARNINGS   ..  
 PLANT-REPORT              VERIFICATION=(PV-A)

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 11: 8:55 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. 8069-REMAI THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR H&VSYSTEMS TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                           |                       |         |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|-----------------------|---------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | ELEC-<br>LOAD<br>(KW) | MAXIMUM |
| JAN   | 0.00000                     |                         |                      |                      | -323.171                    | 15                      | 7                    | -7.F                 | -8.F                                    | 24778.                    | 49.841                |         |
| FEB   | 0.00000                     |                         |                      |                      | -241.228                    | 3                       | 7                    | -5.F                 | -6.F                                    | 22349.                    | 49.841                |         |
| MAR   | 0.00000                     |                         |                      |                      | -189.086                    | 3                       | 6                    | 15.F                 | 12.F                                    | 24913.                    | 49.841                |         |
| APR   | 0.00000                     |                         |                      |                      | -58.657                     | 5                       | 6                    | 31.F                 | 28.F                                    | 24044.                    | 49.841                |         |
| MAY   | 0.00000                     |                         |                      |                      | -14.101                     | 1                       | 6                    | 37.F                 | 37.F                                    | 24778.                    | 49.841                |         |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 24066.                    | 49.841                |         |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 24666.                    | 49.841                |         |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 25004.                    | 49.841                |         |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 23954.                    | 49.841                |         |
| OCT   | 0.00000                     |                         |                      |                      | -55.869                     | 20                      | 8                    | 23.F                 | 22.F                                    | 24666.                    | 49.841                |         |
| NOV   | 0.00000                     |                         |                      |                      | -152.014                    | 3                       | 6                    | 13.F                 | 12.F                                    | 24021.                    | 49.841                |         |
| DEC   | 0.00000                     |                         |                      |                      | -287.836                    | 13                      | 6                    | 2.F                  | 1.F                                     | 24688.                    | 49.841                |         |
| TOTAL | 0.000                       |                         |                      |                      | -1321.962                   |                         |                      |                      |   | 291938.                   |                       |         |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      | -1240.048                               |                           |                       | 49.841  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 11: 8:55 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. 8069-REMAI THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR H&VSYSTEMS TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |                            |  |                   |                            |                            |                              |                           |                                      | C O I N C I D E N T L O A D S                      |  |  |  |
|--------|---------------------------|--------------------------|----------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | COINCIDENT<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | COINCIDENT<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0                         | 527                      | 0                          | 0  | 217               | 744                        | 0                          | 527                          | 0                         | 0                                    | 0.000  | 0.000  | 0.000  | 0.000  |
| FEB    | 0                         | 476                      | 0                          | 0  | 196               | 672                        | 0                          | 476                          | 0                         | 0                                    | 0.000  | 0.000  | 0.000  | 0.000  |
| MAR    | 0                         | 515                      | 0                          | 0  | 229               | 744                        | 0                          | 527                          | 0                         | 12                                   | 0.000  | 0.000  | 0.000  | 0.000  |
| APR    | 0                         | 388                      | 0                          | 0  | 332               | 720                        | 0                          | 510                          | 0                         | 122                                  | 0.000  | 0.000  | 0.000  | 0.000  |
| MAY    | 0                         | 151                      | 0                          | 0  | 593               | 360                        | 0                          | 527                          | 0                         | 376                                  | 0.000  | 0.000  | 0.000  | 0.000  |
| JUN    | 0                         | 0                        | 0                          | 0  | 720               | 0                          | 0                          | 510                          | 0                         | 510                                  | 0.000  | 0.000  | 0.000  | 0.000  |
| JUL    | 0                         | 0                        | 0                          | 0  | 744               | 0                          | 0                          | 527                          | 0                         | 527                                  | 0.000  | 0.000  | 0.000  | 0.000  |
| AUG    | 0                         | 0                        | 0                          | 0  | 744               | 0                          | 0                          | 527                          | 0                         | 527                                  | 0.000  | 0.000  | 0.000  | 0.000  |
| SEP    | 0                         | 0                        | 0                          | 0  | 720               | 0                          | 0                          | 510                          | 0                         | 510                                  | 0.000  | 0.000  | 0.000  | 0.000  |
| OCT    | 0                         | 365                      | 0                          | 0  | 379               | 720                        | 0                          | 527                          | 0                         | 162                                  | 0.000  | 0.000  | 0.000  | 0.000  |
| NOV    | 0                         | 468                      | 0                          | 0  | 252               | 720                        | 0                          | 510                          | 0                         | 42                                   | 0.000  | 0.000  | 0.000  | 0.000  |
| DEC    | 0                         | 527                      | 0                          | 0  | 217               | 744                        | 0                          | 527                          | 0                         | 0                                    | 0.000  | 0.000  | 0.000  | 0.000  |
| ANNUAL | 0                         | 3417                     | 0                          | 0  | 5343              | 5424                       | 0                          | 6205                         | 0                         | 2788                                 |  |  |  |  |



EMC ENGINEERS INC. 80227 E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 11: 8:55 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #1 NIGHT SETBACK BLDG. 8069-REMAI THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- PS-B TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>123.961<br>249.562<br>28/ 9 | NATURAL-GAS<br>490.876<br>1686.519<br>15/ 7 |
|-----|--|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 123.961<br>249.562<br>28/ 9                | 490.876<br>1686.519<br>15/ 7                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 111.523<br>249.220<br>28/22                | 376.822<br>1606.538<br>3/ 7                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 121.608<br>249.220<br>31/22                | 300.879<br>1300.684<br>3/ 6                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 109.848<br>249.220<br>16/ 9                | 99.545<br>847.009<br>5/ 6                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 116.189<br>272.098<br>16/16                | 25.412<br>688.030<br>1/ 6                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 121.014<br>272.751<br>28/15                | 0.000<br>0.000<br>30/ 1                     |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 126.952<br>278.838<br>23/16                | 0.000<br>0.000<br>31/ 1                     |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 128.857<br>277.149<br>23/16                | 0.000<br>0.000<br>31/ 1                     |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 115.261<br>273.712<br>7/16                 | 0.000<br>0.000<br>30/ 1                     |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 112.619<br>250.108<br>1/17                 | 95.974<br>975.021<br>20/ 8                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 115.579<br>249.220<br>30/22                | 245.322<br>1279.169<br>3/ 6                 |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 123.229<br>249.562<br>13/ 8                | 445.796<br>1517.083<br>13/ 6                |
|     | ONE YEAR<br>USE/PEAK                             | 1426.641<br>278.838                        | 2080.626<br>1686.519                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 11: 8:55 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. 8069-REMAI THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 77.94       | 2080.63     |
| SPACE COOL      | 81.97       | 0.00        |
| HVAC AUX        | 686.22      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 580.46      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 0.00        | 0.00        |
| TOTAL           | 1426.59     | 2080.63     |

TOTAL SITE ENERGY 3507.27 MBTU 160.4 KBTU/SQFT-YR GROSS-AREA 160.4 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 6364.83 MBTU 291.1 KBTU/SQFT-YR GROSS-AREA 291.1 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 1.1  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 336.0  
 PEOPLE-HG-LAT = 965.0 PEOPLE-HG-SENS = 635.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.3  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_PEOPLE  
 SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.5  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.06  
 INF-SCHEDULE = L\_ON ..

E-W HEIGHT = 19.0 WIDTH = 56.0 CONS = EXWALL-1  
 AZIMUTH = 90 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 9.0 WIDTH = 35.0 G-T = 2\_PN\_STD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 7.0 WIDTH = 13.0 G-T = 2\_PN\_STD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 20.0 WIDTH = 19.0 CONS = EXWALL-1  
 AZIMUTH = 180 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 19.0 WIDTH = 41.0 CONS = EXWALL-1  
 AZIMUTH = 270 INSIDE-VIS-REPL = 0.2 ..

U-W HEIGHT = 41.0 WIDTH = 41.0 CONS = FLOOR ..

ROOF HEIGHT = 82.0 WIDTH = 82.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

U-W HEIGHT = 8.0 WIDTH = 9.0 CONS = FLOOR  
 AZIMUTH = 180 ..

U-W HEIGHT = 8.0 WIDTH = 9.0 CONS = FLOOR  
 AZIMUTH = 180 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #2 DDC CONTROL FOR BLDG. 8069-REMAI \*  
 LINE-5 \*THE REMAINDER OF THE BLDG. (LESS POOL) \* ..  
 ABORT ERRORS ..



DIAGNOSTIC            WARNINGS ..  
SYSTEMS-REPORT       VERIFICATION=(SV-A)  
                      SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
                      HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON        =DAY-SCHEDULE (1,24) (1.) ..  
SD\_OFF       =DAY-SCHEDULE (1,24) (0.) ..  
SD\_WT\_HT     =DAY-SCHEDULE (1,24) (70.) ..  
SD\_SM\_CL     =DAY-SCHEDULE (1,24) (76.) ..  
SD\_WINT\_OA   =DAY-SCHEDULE (1,24) (0.37) ..  
SD\_WT\_CL     =DAY-SCHEDULE (1,24) (72.) ..  
SD\_SM\_HT     =DAY-SCHEDULE (1,24) (74.) ..

SW\_ON        =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_OFF       =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_HT     =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

SW\_SM\_CL     =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..

SW\_WINT\_OA   =WEEK-SCHEDULE (ALL) SD\_WINT\_OA ..

SW\_WT\_CL     =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..

SW\_SM\_HT     =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..

## \$ FULL ON SYSTEM

S\_ON         =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF        =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
                          THRU OCT 1 SW\_OFF  
                          THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
                          THRU OCT 1 SW\_ON  
                          THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
                          THRU OCT 1 SW\_SM\_HT  
                          THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
                          THRU OCT 1 SW\_SM\_CL  
                          THRU DEC 31 SW\_WT\_CL ..

## \$ OUTSIDE AIR SCHEDULE

S\_OA\_SCHED =SCHEDULE THRU MAY 15 SW\_WINT\_OA  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_WINT\_OA ..

S\_HRLY-RPT =SCHEDULE THRU JAN 13 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU JUL 21 SW\_OFF  
 THRU JUL 23 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ ZONE DESCRIPTION

B-BALL/1ST =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

H-BALL/2ND =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

H&VSYSTEMS =SYSTEM SYSTEM-TYPE = HVSYS  
 MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S\_HE-SCHED  
 OA-CONTROL = FIXED SUPPLY-CFM = 35000.  
 RATED-CFM = 35000. MIN-OUTSIDE-AIR = 0.37  
 MIN-AIR-SCH = S\_OA\_SCHED SUPPLY-DELTA-T = 2.4  
 SUPPLY-KW = 0.00078  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 HEATING-CAPACITY = -1291523.  
 ZONE-NAMES = (B-BALL/1ST) ..

AHU'S\_1&2 =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED OA-CONTROL = FIXED  
 SUPPLY-CFM = 7315. RATED-CFM = 7315.  
 MIN-OUTSIDE-AIR = 0.2 SUPPLY-DELTA-T = 1.8  
 SUPPLY-KW = 0.00059  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 FAN-PLACEMENT = BLOW-THROUGH  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 COOLING-CAPACITY = 171850. COOL-SH-CAP = 144543.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -100648.  
 MIN-HP-T = 0. MAX-HP-SUPP-T = 0. DEFROST-T = 0.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER SIZING-OPTION = COINCIDENT

ZONE-NAMES = (H-BALL/2ND) ..

\$ HOURLY REPORT DESCRIPTION

H&V-BLK =REPORT-BLOCK VARIABLE-TYPE = H&VSYSTEMS  
           VARIABLE-LIST = (3,5,17,39) ..  
 SZ-AHU-BLK =REPORT-BLOCK VARIABLE-TYPE = AHU'S\_1&2  
           VARIABLE-LIST = (3,5,6,17,39) ..  
 H&VZN-BLK =REPORT-BLOCK VARIABLE-TYPE = B-BALL/1ST  
           VARIABLE-LIST = (17,18,7,6) ..  
 SZZONE-BLK =REPORT-BLOCK VARIABLE-TYPE = H-BALL/2ND  
           VARIABLE-LIST = (17,18,7,6) ..  
 AHU-RPTS = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
           REPORT-BLOCK = (H&V-BLK,SZ-AHU-BLK)  
 ..  
 ZONE-RPTS = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
           REPORT-BLOCK = (H&VZN-BLK,SZZONE-BLK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

\$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #2 DDC CONTROL FOR BLDG. 8069-REMAI \*  
 LINE-5 \*THE REMAINDER OF THE BLDG. (LESS POOL) \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
           SUMMARY=(PS-B,BEPS)  
           HOURLY-DATA-SAVE = YES ..

\$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 PD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 PW\_ON =WEEK-SCHEDULE (ALL) PD\_ON ..  
 PW\_OFF =WEEK-SCHEDULE (ALL) PD\_OFF ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 11:19: 9 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 8069-REMAI THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR H&VSYSTEMS TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                           |                      |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|----------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | ELEC<br>LOAD<br>(KW) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -468.267                    | 15                      | -8.F                 | -9.F                 | -1224.438                               | 30702.                    | 49.841               | 49.841                          |
| FEB   | 0.00000                     |                         |                      |                      | -356.345                    | 3                       | -5.F                 | -6.F                 | -1153.788                               | 27700.                    | 49.841               | 49.841                          |
| MAR   | 0.00000                     |                         |                      |                      | -292.756                    | 3                       | 14.F                 | 12.F                 | -853.747                                | 30838.                    | 49.841               | 49.841                          |
| APR   | 0.00000                     |                         |                      |                      | -107.186                    | 5                       | 31.F                 | 29.F                 | -559.830                                | 29777.                    | 49.841               | 49.841                          |
| MAY   | 0.00000                     |                         |                      |                      | -29.284                     | 1                       | 37.F                 | 37.F                 | -447.491                                | 30702.                    | 49.841               | 49.841                          |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 29799.                    | 49.841               | 49.841                          |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 30590.                    | 49.841               | 49.841                          |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 30928.                    | 49.841               | 49.841                          |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 29687.                    | 49.841               | 49.841                          |
| OCT   | 0.00000                     |                         |                      |                      | -99.992                     | 20                      | 23.F                 | 23.F                 | -681.072                                | 30590.                    | 49.841               | 49.841                          |
| NOV   | 0.00000                     |                         |                      |                      | -240.469                    | 3                       | 13.F                 | 12.F                 | -838.546                                | 29754.                    | 49.841               | 49.841                          |
| DEC   | 0.00000                     |                         |                      |                      | -418.510                    | 13                      | 0.F                  | -1.F                 | -1047.523                               | 30612.                    | 49.841               | 49.841                          |
| TOTAL | 0.000                       |                         |                      |                      | -2012.812                   |                         |                      |                      | -1224.438                               | 361697.                   |                      | 49.841                          |
| MAX   |                             |                         |                      |                      | 0.000                       |                         |                      |                      |   |                           |                      |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 11:19: 9 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 8069-REMAI THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR H&VSYSTEMS TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |                            |                   |                            |                            |                     |                        |                           |                                      | C O I N C I D E N T L O A D S                      |  |  |  |
|--------|---------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|---------------------|------------------------|---------------------------|--------------------------------------|--|--|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>CYCLE | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 744                 | 0                      | 0                         | 0                                    | -528.694   | 27.300   | -528.694   | 27.300   |
| FEB    | 0                         | 672                      | 0                          | 0                 | 672                        | 0                          | 672                 | 0                      | 0                         | 0                                    | -542.645   | 27.300   | -542.645   | 27.300   |
| MAR    | 0                         | 732                      | 0                          | 12                | 744                        | 0                          | 744                 | 0                      | 0                         | 12                                   | -531.314   | 27.300   | -531.314   | 27.300   |
| APR    | 0                         | 593                      | 0                          | 127               | 720                        | 0                          | 720                 | 0                      | 0                         | 127                                  | -254.162   | 27.300   | -254.162   | 27.300   |
| MAY    | 0                         | 259                      | 0                          | 485               | 360                        | 0                          | 744                 | 0                      | 0                         | 485                                  | 0.000  | 27.300   | 0.000  | 27.300   |
| JUN    | 0                         | 0                        | 0                          | 720               | 0                          | 0                          | 720                 | 0                      | 0                         | 720                                  | 0.000  | 27.300   | 0.000  | 27.300   |
| JUL    | 0                         | 0                        | 0                          | 744               | 0                          | 0                          | 744                 | 0                      | 0                         | 744                                  | 0.000  | 27.300   | 0.000  | 27.300   |
| AUG    | 0                         | 0                        | 0                          | 744               | 0                          | 0                          | 744                 | 0                      | 0                         | 744                                  | 0.000  | 27.300   | 0.000  | 27.300   |
| SEP    | 0                         | 0                        | 0                          | 720               | 0                          | 0                          | 720                 | 0                      | 0                         | 720                                  | 0.000  | 27.300   | 0.000  | 27.300   |
| OCT    | 0                         | 575                      | 0                          | 169               | 720                        | 0                          | 744                 | 0                      | 0                         | 169                                  | -380.771   | 27.300   | -380.771   | 27.300   |
| NOV    | 0                         | 681                      | 0                          | 39                | 720                        | 0                          | 720                 | 0                      | 0                         | 39                                   | -630.593   | 27.300   | -630.593   | 27.300   |
| DEC    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 744                 | 0                      | 0                         | 0                                    | -602.493   | 27.300   | -602.493   | 27.300   |
| ANNUAL | 0                         | 5000                     | 0                          | 3760              | 5424                       | 0                          | 8760                | 0                      | 0                         | 3760                                 |  |  |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 11:19: 9 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 8069-REMAI THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AHU'S 1&2 TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                            |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -29.509                     | 15                      | 2                    | -7.F                 | -8.F                                    | 7242.                              | 13.149                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -18.467                     | 3                       | 6                    | -1.F                 | -2.F                                    | 6525.                              | 13.049                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -9.447                      | 3                       | 7                    | 14.F                 | 12.F                                    | 7290.                              | 13.049                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.798                      | 1                       | 2                    | 34.F                 | 30.F                                    | 7029.                              | 13.049                          |
| MAY   | 23.35393                    | 16                      | 57.F                 | 56.F                 | 181.265                                 | -0.320                      | 14                      | 21                   | 70.F                 | 65.F                                    | 9363.                              | 28.077                          |
| JUN   | 53.01609                    | 28                      | 90.F                 | 76.F                 | 145.896                                 | 0.000                       |                         |                      |                      |   | 12074.                             | 28.342                          |
| JUL   | 64.15292                    | 13                      | 90.F                 | 79.F                 | 158.834                                 | 0.000                       |                         |                      |                      |   | 13380.                             | 30.637                          |
| AUG   | 62.56360                    | 23                      | 96.F                 | 77.F                 | 151.107                                 | 0.000                       |                         |                      |                      |   | 13573.                             | 29.732                          |
| SEP   | 35.41990                    | 7                       | 92.F                 | 76.F                 | 143.518                                 | 0.000                       |                         |                      |                      |   | 10336.                             | 28.488                          |
| OCT   | 0.72218                     | 1                       | 83.F                 | 68.F                 | 84.008                                  | -0.677                      | 20                      | 7                    | 23.F                 | 23.F                                    | 7263.                              | 21.418                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -7.798                      | 3                       | 6                    | 13.F                 | 12.F                                    | 7020.                              | 13.049                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -25.009                     | 12                      | 5                    | 4.F                  | 3.F                                     | 7202.                              | 13.149                          |
| TOTAL | 239.229                     |                         |                      |                      | 181.265                                 | -92.024                     |                         |                      |                      |   | 108290.                            | 30.637                          |
| MAX   |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 11:19: 9 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 8069-REMAI THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AHU'S 1&2 TOPEKA, KS

| MONTH  | N U M B E R O F          |                          |                            |                   | H O U R S                  |                            |                  |                   | C O I N C I D E N T |                           |  |  | L O A D S  |  |  |  |
|--------|--------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------|-------------------|---------------------|---------------------------|--|--|--|--|--|--|
|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON | HOURS<br>CYCLE ON | HOURS<br>NIGHT      | HOURS<br>FLOATING<br>WHEN | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0                        | 689                      | 0                          | 55                | 744                        | 0                          | 744              | 0                 | 0                   | 0                         | -30.365  | 4.316  | -30.365  | 4.316  | -30.365  | 4.316  |
| FEB    | 0                        | 592                      | 0                          | 80                | 672                        | 0                          | 672              | 0                 | 0                   | 0                         | -22.300  | 4.316  | -22.300  | 4.316  | -22.300  | 4.316  |
| MAR    | 0                        | 505                      | 0                          | 239               | 744                        | 0                          | 744              | 0                 | 0                   | 0                         | -28.897  | 4.316  | -28.897  | 4.316  | -28.897  | 4.316  |
| APR    | 0                        | 344                      | 0                          | 376               | 720                        | 0                          | 720              | 0                 | 0                   | 0                         | -2.657   | 4.316  | -2.657   | 4.316  | -2.657   | 4.316  |
| MAY    | 357                      | 169                      | 0                          | 218               | 360                        | 359                        | 744              | 0                 | 0                   | 0                         | 0.000  | 25.882   | 0.000  | 25.882   | 0.000  | 25.882   |
| JUN    | 699                      | 0                        | 0                          | 21                | 0                          | 699                        | 720              | 0                 | 0                   | 0                         | 0.000  | 28.342   | 0.000  | 28.342   | 0.000  | 28.342   |
| JUL    | 744                      | 0                        | 0                          | 0                 | 0                          | 744                        | 744              | 0                 | 0                   | 0                         | 0.000  | 29.414   | 0.000  | 29.414   | 0.000  | 29.414   |
| AUG    | 740                      | 0                        | 0                          | 4                 | 0                          | 740                        | 744              | 0                 | 0                   | 0                         | 0.000  | 29.732   | 0.000  | 29.732   | 0.000  | 29.732   |
| SEP    | 583                      | 0                        | 0                          | 137               | 0                          | 585                        | 720              | 0                 | 0                   | 0                         | 0.000  | 28.424   | 0.000  | 28.424   | 0.000  | 28.424   |
| OCT    | 14                       | 371                      | 0                          | 359               | 720                        | 14                         | 744              | 0                 | 0                   | 0                         | 0.000  | 21.333   | 0.000  | 21.333   | 0.000  | 21.333   |
| NOV    | 0                        | 494                      | 0                          | 226               | 720                        | 0                          | 720              | 0                 | 0                   | 0                         | -47.170  | 4.316  | -47.170  | 4.316  | -47.170  | 4.316  |
| DEC    | 0                        | 674                      | 0                          | 70                | 744                        | 0                          | 744              | 0                 | 0                   | 0                         | -51.758  | 4.316  | -51.758  | 4.316  | -51.758  | 4.316  |
| ANNUAL | 3137                     | 3838                     | 0                          | 1785              | 5424                       | 3141                       | 8760             | 0                 | 0                   | 0                         |  |  |  |  |  |  |

EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 11:19: 9 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #2 DDC CONTROL FOR BLDG. 8069-REMAI THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO                   | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>154.552<br>249.186<br>28/ 9 | NATURAL-GAS<br>699.678<br>1668.132<br>15/ 5 |
|----------------------|--|--|---|
| JAN                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 154.552<br>249.186<br>28/ 9                | 699.678<br>1668.132<br>15/ 5                |
| FEB                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 139.168<br>248.844<br>28/22                | 546.205<br>1593.714<br>3/ 7                 |
| MAR                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 151.980<br>248.844<br>31/22                | 458.050<br>1245.860<br>3/ 7                 |
| APR                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 137.225<br>248.844<br>16/ 9                | 178.840<br>843.301<br>5/ 5                  |
| MAY                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 140.782<br>266.044<br>31/18                | 51.877<br>694.022<br>1/ 6                   |
| JUN                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 142.973<br>266.949<br>28/16                | 0.000<br>0.000<br>30/ 1                     |
| JUL                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 150.130<br>274.784<br>23/16                | 0.000<br>0.000<br>31/ 1                     |
| AUG                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 151.945<br>271.694<br>23/16                | 0.000<br>0.000<br>31/ 1                     |
| SEP                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 136.654<br>267.449<br>7/16                 | 0.000<br>0.000<br>30/ 1                     |
| OCT                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 140.748<br>248.844<br>31/ 9                | 170.108<br>978.312<br>20/ 7                 |
| NOV                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 144.469<br>248.844<br>30/22                | 380.596<br>1221.640<br>3/ 6                 |
| DEC                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 153.823<br>249.186<br>13/ 8                | 637.134<br>1452.347<br>13/ 8                |
| ONE YEAR<br>USE/PEAK | 1744.449<br>274.784                              | 3122.488<br>1668.132                       |   |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 11:19: 9 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 8069-REMAI THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 115.97      | 3122.49     |
| SPACE COOL      | 78.58       | 0.00        |
| HVAC AUX        | 969.36      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 580.46      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 0.00        | 0.00        |
| TOTAL           | 1744.37     | 3122.49     |

TOTAL SITE ENERGY 4866.94 MBTU 222.6 KBTU/SQFT-YR GROSS-AREA 222.6 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 8361.07 MBTU 382.4 KBTU/SQFT-YR GROSS-AREA 382.4 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.1  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 336.0  
 PEOPLE-HG-LAT = 965.0 PEOPLE-HG-SENS = 635.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.3  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_PEOPLE  
 SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.5  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.06  
 INF-SCHEDULE = L\_ON ..

E-W HEIGHT = 19.0 WIDTH = 56.0 CONS = EXWALL-1  
 AZIMUTH = 90 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 9.0 WIDTH = 35.0 G-T = 2\_PN\_STD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 7.0 WIDTH = 13.0 G-T = 2\_PN\_STD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 20.0 WIDTH = 19.0 CONS = EXWALL-1  
 AZIMUTH = 180 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 19.0 WIDTH = 41.0 CONS = EXWALL-1  
 AZIMUTH = 270 INSIDE-VIS-REFL = 0.2 ..

U-W HEIGHT = 41.0 WIDTH = 41.0 CONS = FLOOR ..

ROOF HEIGHT = 82.0 WIDTH = 82.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

U-W HEIGHT = 8.0 WIDTH = 9.0 CONS = FLOOR  
 AZIMUTH = 180 ..

U-W HEIGHT = 8.0 WIDTH = 9.0 CONS = FLOOR  
 AZIMUTH = 180 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #3 ECONOMIZER BLDG. 8069-REMAI \*  
 LINE-5 \*THE REMAINDER OF THE BLDG. (LESS POOL) \* ..

ABORT

ERRORS ..



DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,5) (55.)  
           (6,22) (74.)  
           (23,24) (55.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,5) (85.)  
           (6,22) (72.)  
           (23,24) (85.) ..  
 SD\_WINT\_OA =DAY-SCHEDULE (1,24) (0.37) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,5) (57.)  
           (6,22) (76.)  
           (23,24) (57.) ..  
 SD\_SM\_HT =DAY-SCHEDULE (1,5) (83.)  
           (6,22) (70.)  
           (23,24) (83.) ..  
 SD\_FAN\_CYC =DAY-SCHEDULE (1,5) (0.)  
           (6,22) (1.)  
           (23,24) (0.) ..  
  
 SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..  
  
 SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..  
  
 SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..  
  
 SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..  
  
 SW\_WINT\_OA =WEEK-SCHEDULE (ALL) SD\_WINT\_OA ..  
  
 SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..  
  
 SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..  
  
 SW\_FAN\_CYC =WEEK-SCHEDULE (ALL) SD\_FAN\_CYC ..

## \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
                   THRU OCT 1 SW\_OFF  
                   THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF

THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F = SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F = SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

## \$ OUTSIDE AIR SCHEDULE

S\_OA\_SCH = SCHEDULE THRU MAY 15 SW\_WINT\_OA  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_WINT\_OA ..

S\_HRLY-RPT = SCHEDULE THRU JAN 13 SW\_OFF  
THRU JAN 15 SW\_ON  
THRU JUL 21 SW\_OFF  
THRU JUL 23 SW\_ON  
THRU DEC 31 SW\_OFF ..

S\_FAN\_CYCL = SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

## \$ ZONE DESCRIPTION

B-BALL/1ST = ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

H-BALL/2ND = ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

H&VSYSTEMS = SYSTEM SYSTEM-TYPE = HVSYS  
MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S\_HE-SCHED  
OA-CONTROL = FIXED SUPPLY-CFM = 35000.  
RATED-CFM = 35000. MIN-OUTSIDE-AIR = 0.37  
MIN-AIR-SCH = S\_OA\_SCH FAN-SCHEDULE = S\_FAN\_CYCL  
SUPPLY-DELTA-T = 2.4 SUPPLY-KW = 0.00078  
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
NIGHT-CYCLE-CTRL = STAY-OFF. NIGHT-VENT-DT = 0.0  
HEATING-CAPACITY = -1291523.  
ZONE-NAMES = (B-BALL/1ST) ..

```

AHU'S_1&2 =SYSTEM      SYSTEM-TYPE = PSZ
                        MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
                        HEATING-SCHEDULE = S_HE-SCHED
                        COOLING-SCHEDULE = S_CL_SCHD  ECONO-LIMIT-T = 70.0
                        SUPPLY-CFM = 7315.  RATED-CFM = 7315.
                        MIN-OUTSIDE-AIR = 0.2  FAN-SCHEDULE = S_FAN_CYCL
                        SUPPLY-DELTA-T = 1.8  SUPPLY-KW = 0.00059
                        MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
                        FAN-PLACEMENT = BLOW-THROUGH
                        NIGHT-CYCLE-CTRL = STAY-OFF  NIGHT-VENT-DT = 0.0
                        COOLING-CAPACITY = 171850.  COOL-SH-CAP = 144543.
                        COOL-FT-MIN = 0.  HEATING-CAPACITY = -100648.
                        MIN-HP-T = 0.  MAX-HP-SUPP-T = 0.  DEFROST-T = 0.
                        CRANKCASE-MAX-T = 0.  OUTSIDE-FAN-T = 45.
                        HEAT-SOURCE = HOT-WATER  SIZING-OPTION = COINCIDENT
                        ZONE-NAMES = (H-BALL/2ND)  ..

```

## \$ HOURLY REPORT DESCRIPTION

```

H&V-BLK  =REPORT-BLOCK VARIABLE-TYPE = H&VSYSTEMS
                        VARIABLE-LIST = (3,5,17,39) ..
SZ-AHU-BLK =REPORT-BLOCK VARIABLE-TYPE = AHU'S_1&2
                        VARIABLE-LIST = (3,5,6,17,39) ..
H&VZN-BLK =REPORT-BLOCK VARIABLE-TYPE = B-BALL/1ST
                        VARIABLE-LIST = (17,18,7,6) ..
SZZONE-BLK =REPORT-BLOCK VARIABLE-TYPE = H-BALL/2ND
                        VARIABLE-LIST = (17,18,7,6) ..
AHU-RPTS  = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                        REPORT-BLOCK = (H&V-BLK,SZ-AHU-BLK)
..
ZONE-RPTS  = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                        REPORT-BLOCK = (H&VZN-BLK,SZZONE-BLK)
..
END  ..
COMPUTE SYSTEMS  ..

```

INPUT PLANT ..

```

$-----$
$ E Z - D O E  P L A N T S  I N P U T $
$-----$

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## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *
        LINE-4 *RUN #3 ECONOMIZER BLDG. 8069-REMAI      *
        LINE-5 *THE REMAINDER OF THE BLDG. (LESS POOL)  * ..

```

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ABORT      ERRORS  ..
DIAGNOSTIC  WARNINGS ..
PLANT-REPORT  VERIFICATION=(PV-A)

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EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 11:41: 1 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER BLDG. 8069-REMAI THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AHU'S 1&2 TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                           |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -25.027                     | 15                      | 21                   | 3.F                  | 1.F                                     | 6305.                     | 13.149                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -15.417                     | 3                       | 7                    | -5.F                 | -6.F                                    | 5679.                     | 13.049                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -8.879                      | 3                       | 9                    | 17.F                 | 13.F                                    | 6353.                     | 13.049                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -1.316                      | 9                       | 7                    | 32.F                 | 30.F                                    | 6122.                     | 13.049                          |
| MAY   | 19.97339                    | 16                      | 13                   | 76.F                 | 67.F                                    | -0.205                      | 1                       | 7                    | 38.F                 | 36.F                                    | 8165.                     | 29.585                          |
| JUN   | 49.98787                    | 28                      | 12                   | 87.F                 | 76.F                                    | 0.000                       |                         |                      |                      |   | 10916.                    | 30.041                          |
| JUL   | 63.78401                    | 13                      | 13                   | 90.F                 | 79.F                                    | 0.000                       |                         |                      |                      |   | 12391.                    | 31.824                          |
| AUG   | 61.76687                    | 23                      | 13                   | 93.F                 | 77.F                                    | 0.000                       |                         |                      |                      |   | 12558.                    | 31.330                          |
| SEP   | 32.39009                    | 7                       | 15                   | 92.F                 | 76.F                                    | 0.000                       |                         |                      |                      |   | 9175.                     | 30.323                          |
| OCT   | 0.85751                     | 1                       | 18                   | 83.F                 | 68.F                                    | -1.399                      | 20                      | 7                    | 23.F                 | 23.F                                    | 6340.                     | 23.399                          |
| NOV   | 0.00000                     |                         |                      |                      | 101.588                                 | -7.481                      | 10                      | 7                    | 20.F                 | 18.F                                    | 6114.                     | 13.049                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -21.216                     | 14                      | 9                    | 10.F                 | 8.F                                     | 6266.                     | 13.149                          |
| TOTAL | 228.760                     |                         |                      |                      |   | -80.940                     |                         |                      |                      |   | 96380.                    |                                 |
| MAX   |                             |                         |                      |                      | 183.444                                 |                             |                         |                      |                      | -105.120                                |                           | 31.824                          |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 11:41: 1 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER BLDG. 8069-REMAI THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AHU'S 1&2 TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |  |                   |                            |                            |                              |                           |                                      |  | C O I N C I D E N T L O A D S                 |  |  |  |
|--------|---------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|---|--|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | COINCIDENT<br>ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |  |
| JAN    | 0                         | 505                      | 0  | 239               | 744                        | 0                          | 527                          | 0                         | 0                                    | 0.000  | 0.000   | 0.000  |  |  |
| FEB    | 0                         | 430                      | 0  | 242               | 672                        | 0                          | 476                          | 0                         | 0                                    | 0.000  | 0.000   | 0.000  |  |  |
| MAR    | 0                         | 302                      | 0  | 442               | 744                        | 0                          | 527                          | 0                         | 0                                    | 0.000  | 0.000   | 0.000  |  |  |
| APR    | 0                         | 63                       | 0  | 657               | 720                        | 0                          | 510                          | 0                         | 0                                    | 0.000  | 0.000   | 0.000  |  |  |
| MAY    | 204                       | 15                       | 0  | 525               | 360                        | 384                        | 527                          | 0                         | 0                                    | 0.000  | 0.000   | 28.559   |  |  |
| JUN    | 456                       | 0                        | 0  | 264               | 0                          | 720                        | 510                          | 0                         | 0                                    | 0.000  | 0.000   | 29.751   |  |  |
| JUL    | 512                       | 0                        | 0  | 232               | 0                          | 744                        | 527                          | 0                         | 0                                    | 0.000  | 0.000   | 31.046   |  |  |
| AUG    | 509                       | 0                        | 0  | 235               | 0                          | 744                        | 527                          | 0                         | 0                                    | 0.000  | 0.000   | 31.045   |  |  |
| SEP    | 352                       | 0                        | 0  | 368               | 0                          | 696                        | 510                          | 0                         | 0                                    | 0.000  | 0.000   | 30.301   |  |  |
| OCT    | 11                        | 85                       | 0  | 648               | 720                        | 20                         | 527                          | 0                         | 0                                    | 0.000  | 0.000   | 23.180   |  |  |
| NOV    | 0                         | 289                      | 0  | 431               | 720                        | 0                          | 510                          | 0                         | 0                                    | 0.000  | 0.000   | 0.000  |  |  |
| DEC    | 0                         | 493                      | 0  | 251               | 744                        | 0                          | 527                          | 0                         | 0                                    | 0.000  | 0.000   | 0.000  |  |  |
| ANNUAL | 2044                      | 2182                     | 0  | 4534              | 5424                       | 3308                       | 6205                         | 0                         | 0                                    |  |   | 1979   |  |  |

| MO  | UTILITY -<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>123.906<br>249.434<br>28/ 9 | NATURAL-GAS<br>490.887<br>1680.285<br>15/ 7 |
|-----|---|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 111.472<br>249.093<br>28/22                | 376.478<br>1599.241<br>3/ 7                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 121.584<br>249.093<br>31/22                | 302.430<br>1266.990<br>3/ 7                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 109.831<br>249.093<br>16/ 9                | 100.606<br>870.371<br>5/ 7                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 114.551<br>271.192<br>31/18                | 25.441<br>711.469<br>1/ 7                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 119.446<br>272.751<br>28/15                | 0.000<br>0.000<br>30/ 1                     |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 126.526<br>278.838<br>23/16                | 0.000<br>0.000<br>31/ 1                     |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 128.251<br>277.149<br>23/16                | 0.000<br>0.000<br>31/ 1                     |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 113.116<br>273.713<br>7/16                 | 0.000<br>0.000<br>30/ 1                     |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 112.569<br>250.072<br>1/17                 | 97.058<br>1045.115<br>20/ 7                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 115.570<br>249.093<br>30/22                | 246.878<br>1214.664<br>3/ 6                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 123.184<br>249.434<br>13/ 8                | 445.270<br>1502.673<br>13/ 8                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              |  |   |
|     | ONE YEAR<br>USE/PEAK                              | 1420.008<br>278.838                        | 2085.049<br>1680.285                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 6/ 2/1995 11:41: 1 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER BLDG. 8069-REMAI THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 77.79       | 2085.05     |
| SPACE COOL      | 75.56       | 0.00        |
| HVAC AUX        | 686.15      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 580.46      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 0.00        | 0.00        |
| TOTAL           | 1419.96     | 2085.05     |

TOTAL SITE ENERGY 3505.06 MBTU 160.3 KBTU/SQFT-YR GROSS-AREA 160.3 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 6349.34 MBTU 290.4 KBTU/SQFT-YR GROSS-AREA 290.4 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 4.7  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 336.0  
 PEOPLE-HG-LAT = 965.0 PEOPLE-HG-SENS = 635.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.3  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_PEOPLE  
 SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.5  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.06  
 INF-SCHEDULE = L\_ON ..

E-W HEIGHT = 19.0 WIDTH = 56.0 CONS = EXWALL-1  
 AZIMUTH = 90 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 9.0 WIDTH = 35.0 G-T = 2\_PN\_STD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 7.0 WIDTH = 13.0 G-T = 2\_PN\_STD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 20.0 WIDTH = 19.0 CONS = EXWALL-1  
 AZIMUTH = 180 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 19.0 WIDTH = 41.0 CONS = EXWALL-1  
 AZIMUTH = 270 INSIDE-VIS-REFL = 0.2 ..

U-W HEIGHT = 41.0 WIDTH = 41.0 CONS = FLOOR ..

ROOF HEIGHT = 82.0 WIDTH = 82.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

U-W HEIGHT = 8.0 WIDTH = 9.0 CONS = FLOOR  
 AZIMUTH = 180 ..

U-W HEIGHT = 8.0 WIDTH = 9.0 CONS = FLOOR  
 AZIMUTH = 180 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #4 NIGHT INFILTRATION BLDG. 8069-R \*  
 LINE-5 \*THE REMAINDER OF THE BLDG. (LESS POOL) \* ..  
 ABORT ERRORS ..



DIAGNOSTIC            WARNINGS ..  
 SYSTEMS-REPORT      VERIFICATION=(SV-A)  
                      SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
                      HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON        =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF      =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT    =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_SM\_CL    =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_WINT\_OA =DAY-SCHEDULE (1,5) (0.)

(6,22) (0.37)  
 (23,24) (0.) ..

SD\_WT\_CL    =DAY-SCHEDULE (1,24) (76.) ..  
 SD\_SM\_HT    =DAY-SCHEDULE (1,24) (70.) ..  
 SD\_SM\_OA    =DAY-SCHEDULE (1,5) (0.)

(6,22) (1.)  
 (23,24) (0.) ..

SD\_SZ'S\_OA =DAY-SCHEDULE (1,5) (0.)  
 (6,22) (0.2)  
 (23,24) (0.) ..



SW\_ON        =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_OFF      =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_HT    =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

SW\_SM\_CL    =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..

SW\_WINT\_OA =WEEK-SCHEDULE (ALL) SD\_WINT\_OA ..

SW\_WT\_CL    =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..

SW\_SM\_HT    =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..

SW\_SM\_OA    =WEEK-SCHEDULE (ALL) SD\_SM\_OA ..

SW\_SZ'S\_OA =WEEK-SCHEDULE (ALL) SD\_SZ'S\_OA ..

## \$ FULL ON SYSTEM

S\_ON        =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF      =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
                          THRU OCT 1 SW\_OFF  
                          THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
                          THRU OCT 1 SW\_ON

THRU DEC 31 SW\_OFF ..

\$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

\$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

\$ OUTSIDE AIR SCHEDULE

S\_OA\_SCHED =SCHEDULE THRU MAY 15 SW\_WINT\_OA  
THRU OCT 1 SW\_SM\_OA  
THRU DEC 31 SW\_WINT\_OA ..

S\_HRLY-RPT =SCHEDULE THRU JAN 13 SW\_OFF  
THRU JAN 15 SW\_ON  
THRU JUL 21 SW\_OFF  
THRU JUL 23 SW\_ON  
THRU DEC 31 SW\_OFF ..

S\_SZ'S\_OA\* =SCHEDULE THRU DEC 31 SW\_SZ'S\_OA ..

\$ ZONE DESCRIPTION


B-BALL/1ST =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

H-BALL/2ND =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

\$ SYSTEM DESCRIPTION

H&VSYSTEMS =SYSTEM SYSTEM-TYPE = HVSYS  
MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S\_HE-SCHED  
OA-CONTROL = FIXED SUPPLY-CFM = 35000.  
RATED-CFM = 35000. MIN-OUTSIDE-AIR = 0.37  
MIN-AIR-SCH = S\_OA\_SCHED SUPPLY-DELTA-T = 2.4 ←  
SUPPLY-KW = 0.00078  
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
HEATING-CAPACITY = -1291523.  
ZONE-NAMES = (B-BALL/1ST) ..

AHU'S\_1&2 =SYSTEM SYSTEM-TYPE = PSZ

MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED OA-CONTROL = FIXED  
 SUPPLY-CFM = 7315. RATED-CFM = 7315.  
 MIN-OUTSIDE-AIR = 0.2 MIN-AIR-SCH = S SZ'S\_OA%   
 SUPPLY-DELTA-T = 1.8 SUPPLY-KW = 0.00059  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 FAN-PLACEMENT = BLOW-THROUGH  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 COOLING-CAPACITY = 171850. COOL-SH-CAP = 144543.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -100648.  
 MIN-HP-T = 0. MAX-HP-SUPP-T = 0. DEFROST-T = 0.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (H-BALL/2ND) ..

## \$ HOURLY REPORT DESCRIPTION

H&V-BLK =REPORT-BLOCK VARIABLE-TYPE = H&VSYSTEMS  
           VARIABLE-LIST = (3,5,17,39) ..  
 SZ-AHU-BLK =REPORT-BLOCK VARIABLE-TYPE = AHU'S\_1&2  
           VARIABLE-LIST = (3,5,6,17,39) ..  
 H&VZN-BLK =REPORT-BLOCK VARIABLE-TYPE = B-BALL/1ST  
           VARIABLE-LIST = (17,18,7,6) ..  
 SZZONE-BLK =REPORT-BLOCK VARIABLE-TYPE = H-BALL/2ND  
           VARIABLE-LIST = (17,18,7,6) ..  
 AHU-RPTS = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
           REPORT-BLOCK = (H&V-BLK,SZ-AHU-BLK)  
 ..  
 ZONE-RPTS = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
           REPORT-BLOCK = (H&VZN-BLK,SZZONE-BLK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #4 NIGHT INFILTRATION BLDG. 8069-R \*  
 LINE-5 \*THE REMAINDER OF THE BLDG. (LESS POOL) \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
               SUMMARY=(PS-B,BEPS)



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 13:13:53 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION BLDG. 8069-R THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AHU'S 1&2 TOPEKA, KS

| MONTH | COOLING                     |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING                     |                         |                      |                      | ELEC                                    |                           |                                 |  |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|--|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |  |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -35.529                     | 15                      | -8.F                 | -9.F                 | -121.121                                | 7242.                     | 13.149                          |  |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -23.585                     | 3                       | -1.F                 | -2.F                 | -115.538                                | 6525.                     | 13.049                          |  |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -13.192                     | 3                       | 15.F                 | 12.F                 | -107.928                                | 7290.                     | 13.049                          |  |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -1.151                      | 5                       | 30.F                 | 27.F                 | -46.546                                 | 7029.                     | 13.049                          |  |
| MAY   | 28.05231                    | 16                      | 76.F                 | 67.F                 | 193.595                                 | -0.310                      | 1                       | 37.F                 | 37.F                 | -15.782                                 | 9771.                     | 30.476                          |  |
| JUN   | 62.12816                    | 28                      | 90.F                 | 76.F                 | 175.043                                 | 0.000                       |                         |                      |                      | 0.000                                   | 12901.                    | 30.628                          |  |
| JUL   | 74.27632                    | 13                      | 90.F                 | 79.F                 | 191.737                                 | 0.000                       |                         |                      |                      | 0.000                                   | 14302.                    | 32.286                          |  |
| AUG   | 72.52496                    | 23                      | 93.F                 | 77.F                 | 180.770                                 | 0.000                       |                         |                      |                      | 0.000                                   | 14505.                    | 31.734                          |  |
| SEP   | 43.45966                    | 7                       | 92.F                 | 76.F                 | 173.100                                 | 0.000                       |                         |                      |                      | 0.000                                   | 11037.                    | 30.894                          |  |
| OCT   | 1.08288                     | 1                       | 85.F                 | 68.F                 | 107.587                                 | -1.425                      | 20                      | 23.F                 | 23.F                 | -63.189                                 | 7296.                     | 24.031                          |  |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -11.167                     | 3                       | 13.F                 | 12.F                 | -102.650                                | 7020.                     | 13.049                          |  |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -31.238                     | 15                      | 9.F                  | 7.F                  | -111.369                                | 7202.                     | 13.149                          |  |
| TOTAL | 281.524                     |                         |                      |                      |   | -117.597                    |                         |                      |                      |   | 112113.                   |                                 |  |
| MAX   |                             |                         |                      |                      | 193.595                                 |                             |                         |                      |                      | -121.121                                |                           | 32.286                          |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 13:13:53 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION BLDG. 8069-R THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AHU'S 1&2 TOPEKA, KS

| MONTH  | COOLING         |                          |  |                   | HEATING                    |                            |                     |                           | ELEC                                 |  |  |                                 |
|--------|-----------------|--------------------------|--|-------------------|----------------------------|----------------------------|---------------------|---------------------------|--------------------------------------|--|--|---------------------------------|
|        | COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | TRICAL<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN    | 0               | 735                      | 0  | 9                 | 744                        | 0                          | 744                 | 0                         | 9                                    | -5.484   | 4.316  | 4.316                           |
| FEB    | 0               | 641                      | 0  | 31                | 672                        | 0                          | 672                 | 0                         | 31                                   | -2.088   | 4.316  | 4.316                           |
| MAR    | 0               | 579                      | 0  | 165               | 744                        | 0                          | 744                 | 0                         | 165                                  | -5.316   | 4.316  | 4.316                           |
| APR    | 0               | 367                      | 0  | 353               | 720                        | 0                          | 720                 | 0                         | 353                                  | -0.454   | 4.316  | 4.316                           |
| MAY    | 374             | 157                      | 0  | 213               | 360                        | 375                        | 744                 | 0                         | 213                                  | 0.000  | 29.183                                       | 30.628                          |
| JUN    | 711             | 0                        | 0  | 9                 | 0                          | 711                        | 720                 | 0                         | 9                                    | 0.000  | 30.628                                       | 31.495                          |
| JUL    | 744             | 0                        | 0  | 0                 | 0                          | 744                        | 744                 | 0                         | 0                                    | 0.000  | 31.393                                       | 30.816                          |
| AUG    | 741             | 0                        | 0  | 3                 | 0                          | 742                        | 720                 | 0                         | 3                                    | 0.000  | 24.031                                       | 4.316                           |
| SEP    | 665             | 0                        | 0  | 55                | 0                          | 667                        | 720                 | 0                         | 55                                   | 0.000  | 4.316  | 4.316                           |
| OCT    | 19              | 385                      | 0  | 340               | 720                        | 19                         | 744                 | 0                         | 340                                  | -15.127  | 4.316  | 4.316                           |
| NOV    | 0               | 545                      | 0  | 175               | 720                        | 0                          | 744                 | 0                         | 175                                  | -21.978  | 4.316  | 4.316                           |
| DEC    | 0               | 721                      | 0  | 23                | 744                        | 0                          | 744                 | 0                         | 23                                   |  |  |                                 |
| ANNUAL | 3254            | 4130                     | 0  | 1376              | 5424                       | 3258                       | 8760                | 0                         | 1376                                 |  |  |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 13:13:53 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION BLDG. 8069-R THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>148.920<br>249.383<br>28/ 9 | NATURAL-GAS<br>496.204<br>1677.795<br>15/ 6 |
|-----|--|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 148.920<br>249.383<br>28/ 9                | 496.204<br>1677.795<br>15/ 6                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 133.849<br>249.042<br>28/22                | 378.767<br>1592.294<br>3/ 7                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 145.764<br>249.042<br>31/22                | 297.271<br>1263.417<br>3/ 7                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 132.898<br>249.042<br>15/ 8                | 93.307<br>852.298<br>5/ 7                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 140.462<br>274.233<br>31/18                | 23.512<br>653.961<br>1/ 7                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 145.797<br>274.755<br>28/16                | 0.000<br>0.000<br>30/ 1                     |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 153.278<br>280.417<br>23/15                | 0.000<br>0.000<br>31/ 1                     |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 155.128<br>278.531<br>23/16                | 0.000<br>0.000<br>31/ 1                     |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 139.048<br>275.662<br>7/16                 | 0.000<br>0.000<br>30/ 1                     |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 136.383<br>252.230<br>1/17                 | 90.309<br>1015.888<br>20/ 7                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 138.903<br>249.042<br>30/22                | 242.117<br>1203.320<br>3/ 6                 |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 148.027<br>249.383<br>13/ 8                | 449.226<br>1473.683<br>13/ 8                |
|     | ONE YEAR<br>USE/PEAK                             | 1718.458<br>280.417                        | 2070.712<br>1677.795                        |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOB-2.1D 5/17/1995 13:13:53 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION BLDG. 8069-R THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 78.31       | 2070.71     |
| SPACE COOL                                       | 91.63       | 0.00        |
| HVAC AUX   | 967.97      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 580.46      | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 0.00        | 0.00        |
| TOTAL  | 1718.36     | 2070.71     |

TOTAL SITE ENERGY 3789.17 MBTU 173.3 KBTU/SQFT-YR GROSS-AREA 173.3 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 7231.25 MBTU 330.8 KBTU/SQFT-YR GROSS-AREA 330.8 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 1.1  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 336.0  
 PEOPLE-HG-LAT = 965.0 PEOPLE-HG-SENS = 635.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.3  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_PEOPLE  
 SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.5  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.06  
 INF-SCHEDULE = L\_ON ..

E-W HEIGHT = 19.0 WIDTH = 56.0 CONS = EXWALL-1  
 AZIMUTH = 90 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 9.0 WIDTH = 35.0 G-T = 2\_PN\_STD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 7.0 WIDTH = 13.0 G-T = 2\_PN\_STD  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 20.0 WIDTH = 19.0 CONS = EXWALL-1  
 AZIMUTH = 180 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 19.0 WIDTH = 41.0 CONS = EXWALL-1  
 AZIMUTH = 270 INSIDE-VIS-REFL = 0.2 ..

U-W HEIGHT = 41.0 WIDTH = 41.0 CONS = FLOOR ..

ROOF HEIGHT = 82.0 WIDTH = 82.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

U-W HEIGHT = 8.0 WIDTH = 9.0 CONS = FLOOR  
 AZIMUTH = 180 ..

U-W HEIGHT = 8.0 WIDTH = 9.0 CONS = FLOOR  
 AZIMUTH = 180 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #5 DAY INFILTRATION BLDG. 8069-R \*  
 LINE-5 \*THE REMAINDER OF THE BLDG. (LESS POOL) \* ..  
 ABORT ERRORS ..



DIAGNOSTIC            WARNINGS ..  
 SYSTEMS-REPORT      VERIFICATION=(SV-A)  
                      SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
                      HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON        =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF      =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT    =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_SM\_CL    =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_WINT\_OA =DAY-SCHEDULE (1,5) (0.37)

(6,22) (0.)  
 (23,24) (0.37) ..

SD\_WT\_CL    =DAY-SCHEDULE (1,24) (76.) ..

SD\_SM\_HT    =DAY-SCHEDULE (1,24) (70.) ..

SD\_SM\_OA    =DAY-SCHEDULE (1,5) (1.)

(6,22) (0.)

(23,24) (1.) ..

SD\_SZ'S\_OA =DAY-SCHEDULE (1,5) (0.2)

(6,22) (0.)

(23,24) (0.2) ..

SW\_ON        =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_OFF      =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_HT    =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

SW\_SM\_CL    =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..

SW\_WINT\_OA =WEEK-SCHEDULE (ALL) SD\_WINT\_OA ..

SW\_WT\_CL    =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..

SW\_SM\_HT    =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..

SW\_SM\_OA    =WEEK-SCHEDULE (ALL) SD\_SM\_OA ..

SW\_SZ'S\_OA =WEEK-SCHEDULE (ALL) SD\_SZ'S\_OA ..

## \$ FULL ON SYSTEM

S\_ON        =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF      =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
                                  THRU OCT 1 SW\_OFF  
                                  THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
                                  THRU OCT 1 SW\_ON

THRU DEC 31 SW\_OFF ..

\$ HEATING SET TEMP

S\_HT\_SET\_F = SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

\$ COOLING SET TEMP

S\_CL\_SET\_F = SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

\$ OUTSIDE AIR SCHEDULE

S\_OA\_SCHED = SCHEDULE THRU MAY 15 SW\_WINT\_OA  
THRU OCT 1 SW\_SM\_OA  
THRU DEC 31 SW\_WINT\_OA ..

S\_HRLY-RPT = SCHEDULE THRU JAN 13 SW\_OFF  
THRU JAN 15 SW\_ON  
THRU JUL 21 SW\_OFF  
THRU JUL 23 SW\_ON  
THRU DEC 31 SW\_OFF ..

S\_SZ'S\_OA\* = SCHEDULE THRU DEC 31 SW\_SZ'S\_OA ..

\$ ZONE DESCRIPTION

B-BALL/1ST = ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

H-BALL/2ND = ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

\$ SYSTEM DESCRIPTION

H&VSYSTEMS = SYSTEM SYSTEM-TYPE = HVSYS  
MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S\_HE-SCHED  
OA-CONTROL = FIXED SUPPLY-CFM = 35000.  
RATED-CFM = 35000. MIN-OUTSIDE-AIR = 0.37  
MIN-AIR-SCH = S\_OA\_SCHED SUPPLY-DELTA-T = 2.4  
SUPPLY-KW = 0.00078  
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
HEATING-CAPACITY = -1291523.  
ZONE-NAMES = (B-BALL/1ST) ..

AHU'S\_1&2 = SYSTEM SYSTEM-TYPE = PSZ

```

MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
HEATING-SCHEDULE = S_HE-SCHED
COOLING-SCHEDULE = S_CL_SCHED  OA-CONTROL = FIXED
SUPPLY-CFM = 7315.  RATED-CFM = 7315.
MIN-OUTSIDE-AIR = 0.2  MIN-AIR-SCH = S_SZ'S_OA%
SUPPLY-DELTA-T = 1.8  SUPPLY-KW = 0.00059
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
FAN-PLACEMENT = BLOW-THROUGH
NIGHT-CYCLE-CTRL = STAY-OFF  NIGHT-VENT-DT = 0.0
COOLING-CAPACITY = 171850.  COOL-SH-CAP = 144543.
COOL-FT-MIN = 0.  HEATING-CAPACITY = -100648.
MIN-HP-T = 0.  MAX-HP-SUPP-T = 0.  DEFROST-T = 0.
CRANKCASE-MAX-T = 0.  OUTSIDE-FAN-T = 45.
HEAT-SOURCE = HOT-WATER  SIZING-OPTION = COINCIDENT
ZONE-NAMES = (H-BALL/2ND)  ..

```

## \$ HOURLY REPORT DESCRIPTION

```

H&V-BLK  =REPORT-BLOCK VARIABLE-TYPE = H&VSYSTEMS
          VARIABLE-LIST = (3,5,17,39) ..
SZ-AHU-BLK =REPORT-BLOCK VARIABLE-TYPE = AHU'S_1&2
          VARIABLE-LIST = (3,5,6,17,39) ..
H&VZN-BLK =REPORT-BLOCK VARIABLE-TYPE = B-BALL/1ST
          VARIABLE-LIST = (17,18,7,6) ..
SZZONE-BLK =REPORT-BLOCK VARIABLE-TYPE = H-BALL/2ND
          VARIABLE-LIST = (17,18,7,6) ..
AHU-RPTS  = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (H&V-BLK,SZ-AHU-BLK)
..
ZONE-RPTS = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (H&VZN-BLK,SZZONE-BLK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

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$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

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## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #5 DAY INFILTRATION BLDG. 8069-R      *
        LINE-5 *THE REMAINDER OF THE BLDG. (LESS POOL)  * ..

```

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ABORT      ERRORS  ..
DIAGNOSTIC  WARNINGS ..
PLANT-REPORT VERIFICATION=(PV-A)
            SUMMARY=(PS-B,BEPS)

```

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 13:24:51 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION BLDG. 8069-R THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR H&VSYSTEMS TOPEKA, KS

| MONTH        | -- C O O L I N G --         |                         |                      |                      | -- H E A T I N G --                     |                             |                         |                      | -- E L E C --        |   |                           |                                 |
|--------------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|              | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN          | 0.00000                     |                         |                      |                      | 0.000                                   | -135.359                    | 15                      | -8.F                 | -9.F                 | -1183.851                               | 30702.                    | 49.841                          |
| FEB          | 0.00000                     |                         |                      |                      | 0.000                                   | -103.026                    | 3                       | -1.F                 | -2.F                 | -1037.317                               | 27700.                    | 49.841                          |
| MAR          | 0.00000                     |                         |                      |                      | 0.000                                   | -85.492                     | 4                       | 14.F                 | 12.F                 | -795.337                                | 30838.                    | 49.841                          |
| APR          | 0.00000                     |                         |                      |                      | 0.000                                   | -32.170                     | 5                       | 31.F                 | 29.F                 | -481.643                                | 29777.                    | 49.841                          |
| MAY          | 0.00000                     |                         |                      |                      | 0.000                                   | -8.517                      | 1                       | 38.F                 | 37.F                 | -306.761                                | 30702.                    | 49.841                          |
| JUN          | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 29799.                    | 49.841                          |
| JUL          | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 30590.                    | 49.841                          |
| AUG          | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 30928.                    | 49.841                          |
| SEP          | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 29687.                    | 49.841                          |
| OCT          | 0.00000                     |                         |                      |                      | 0.000                                   | -25.310                     | 20                      | 25.F                 | 25.F                 | -550.208                                | 30590.                    | 49.841                          |
| NOV          | 0.00000                     |                         |                      |                      | 0.000                                   | -69.119                     | 3                       | 13.F                 | 12.F                 | -767.176                                | 29754.                    | 49.841                          |
| DEC          | 0.00000                     |                         |                      |                      | 0.000                                   | -117.992                    | 14                      | 2.F                  | 1.F                  | -983.318                                | 30612.                    | 49.841                          |
| TOTAL<br>MAX | 0.000                       |                         |                      |                      | 0.000                                   | -576.984                    |                         |                      |                      | -1183.851                               | 361697.                   | 49.841                          |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 13:24:51 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION BLDG. 8069-R THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR H&VSYSTEMS TOPEKA, KS

| MONTH  | -- N U M B E R O F H O U R S -- |                          |  |                           | -- COINCIDENT LOADS --     |                            |                     |                     | -- HEATING COOLING PEAK (KBTU/HR) -- |                           |                                      |                                       | -- HEATING COOLING PEAK (KW) --       |  |                                       |  |
|--------|---------------------------------|--------------------------|--|---------------------------|----------------------------|----------------------------|---------------------|---------------------|--------------------------------------|---------------------------|--------------------------------------|---------------------------------------|---------------------------------------|--|---------------------------------------|--|
|        | HOURS<br>COOLING<br>LOAD        | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING<br>LOAD | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>ON | HOURS<br>CYCLE<br>ON                 | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK | HEATING<br>LOAD AT<br>COOLING<br>PEAK | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK | HEATING<br>LOAD AT<br>COOLING<br>PEAK | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK |
| JAN    | 0                               | 239                      | 0  | 505                       | 744                        | 0                          | 744                 | 0                   | 0                                    | 0                         | 505                                  | -460.432                              | -460.432                              | 27.300                                 | -460.432                              | 27.300                                 |
| FEB    | 0                               | 217                      | 0  | 455                       | 672                        | 0                          | 672                 | 0                   | 0                                    | 0                         | 455                                  | -472.526                              | -472.526                              | 27.300                                 | -472.526                              | 27.300                                 |
| MAR    | 0                               | 236                      | 0  | 508                       | 744                        | 0                          | 744                 | 0                   | 0                                    | 0                         | 508                                  | -463.483                              | -463.483                              | 27.300                                 | -463.483                              | 27.300                                 |
| APR    | 0                               | 229                      | 0  | 491                       | 720                        | 0                          | 720                 | 0                   | 0                                    | 0                         | 491                                  | -84.461                               | -84.461                               | 27.300                                 | -84.461                               | 27.300                                 |
| MAY    | 0                               | 115                      | 0  | 629                       | 360                        | 0                          | 744                 | 0                   | 0                                    | 0                         | 629                                  | 0.000                                 | 0.000                                 | 27.300                                 | 0.000                                 | 27.300                                 |
| JUN    | 0                               | 0                        | 0  | 720                       | 0                          | 0                          | 720                 | 0                   | 0                                    | 0                         | 720                                  | 0.000                                 | 0.000                                 | 27.300                                 | 0.000                                 | 27.300                                 |
| JUL    | 0                               | 0                        | 0  | 744                       | 0                          | 0                          | 744                 | 0                   | 0                                    | 0                         | 744                                  | 0.000                                 | 0.000                                 | 27.300                                 | 0.000                                 | 27.300                                 |
| AUG    | 0                               | 0                        | 0  | 744                       | 0                          | 0                          | 744                 | 0                   | 0                                    | 0                         | 744                                  | 0.000                                 | 0.000                                 | 27.300                                 | 0.000                                 | 27.300                                 |
| SEP    | 0                               | 0                        | 0  | 720                       | 0                          | 0                          | 720                 | 0                   | 0                                    | 0                         | 720                                  | 0.000                                 | 0.000                                 | 27.300                                 | 0.000                                 | 27.300                                 |
| OCT    | 0                               | 229                      | 0  | 515                       | 720                        | 0                          | 744                 | 0                   | 0                                    | 0                         | 515                                  | -284.058                              | -284.058                              | 27.300                                 | -284.058                              | 27.300                                 |
| NOV    | 0                               | 230                      | 0  | 490                       | 720                        | 0                          | 720                 | 0                   | 0                                    | 0                         | 490                                  | -546.565                              | -546.565                              | 27.300                                 | -546.565                              | 27.300                                 |
| DEC    | 0                               | 242                      | 0  | 502                       | 744                        | 0                          | 744                 | 0                   | 0                                    | 0                         | 502                                  | -550.577                              | -550.577                              | 27.300                                 | -550.577                              | 27.300                                 |
| ANNUAL | 0                               | 1737                     | 0  | 7023                      | 5424                       | 0                          | 8760                | 0                   | 0                                    | 0                         | 7023                                 |                                       |                                       |  |                                       |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 13:24:51 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION BLDG. 8069-R THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AHU'S 1&2 TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                   |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -16.187                     | 14                      | 23                   | -4.F                 | -5.F                                    | 7242.                     | 13.149                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -9.590                      | 3                       | 1                    | 2.F                  | 1.F                                     | 6525.                     | 13.049                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -4.653                      | 4                       | 5                    | 14.F                 | 12.F                                    | 7290.                     | 13.049                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -1.147                      | 1                       | 3                    | 36.F                 | 32.F                                    | 7029.                     | 13.049                          |
| MAY   | 26.73633                    | 16                      | 57.F                 | 56.F                 | 220.978                                 | -0.553                      | 6                       | 23                   | 51.F                 | 47.F                                    | 9619.                     | 29.573                          |
| JUN   | 53.74252                    | 29                      | 89.F                 | 75.F                 | 119.513                                 | 0.000                       |                         |                      |                      | 0.000                                   | 12106.                    | 25.929                          |
| JUL   | 60.69129                    | 13                      | 90.F                 | 79.F                 | 122.046                                 | 0.000                       |                         |                      |                      | 0.000                                   | 13068.                    | 27.359                          |
| AUG   | 60.19955                    | 23                      | 95.F                 | 77.F                 | 120.866                                 | 0.000                       |                         |                      |                      | 0.000                                   | 13349.                    | 27.210                          |
| SEP   | 40.77584                    | 7                       | 92.F                 | 76.F                 | 117.034                                 | 0.000                       |                         |                      |                      | 0.000                                   | 10737.                    | 26.184                          |
| OCT   | 0.80793                     | 1                       | 83.F                 | 68.F                 | 97.565                                  | -1.186                      | 2                       | 5                    | 55.F                 | 53.F                                    | 7271.                     | 22.998                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -3.472                      | 3                       | 5                    | 13.F                 | 12.F                                    | 7020.                     | 13.049                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -13.121                     | 14                      | 23                   | 3.F                  | 2.F                                     | 7202.                     | 13.149                          |
| TOTAL | 242.953                     |                         |                      |                      |   | -49.909                     |                         |                      |                      |   | 108452.                   |                                 |
| MAX   |                             |                         |                      |                      | 220.978                                 |                             |                         |                      |                      | -114.697                                |                           | 29.573                          |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 13:24:51 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION BLDG. 8069-R THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AHU'S 1&2 TOPEKA, KS

| MONTH  | HOURS           |                 |                                 |          | HOURS             |                   |                     |               | HOURS            |  |  |  | COINCIDENT LOADS-- |  |
|--------|-----------------|-----------------|---------------------------------|----------|-------------------|-------------------|---------------------|---------------|------------------|--|--|--|--------------------|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COINCIDENT<br>COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON<br>CYCLE ON | FANS<br>NIGHT | FLOATING<br>WHEN | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |                    |  |
| JAN    | 0               | 382             | 0                               | 362      | 744               | 0                 | 0                   | 0             | 0                | -15.635  | 4.316  |  |                    |  |
| FEB    | 0               | 269             | 0                               | 403      | 672               | 0                 | 0                   | 0             | 0                | -11.140  | 4.316  |  |                    |  |
| MAR    | 0               | 261             | 0                               | 483      | 744               | 0                 | 0                   | 0             | 0                | -11.300  | 4.316  |  |                    |  |
| APR    | 0               | 230             | 0                               | 490      | 720               | 0                 | 0                   | 0             | 0                | -4.196   | 4.316  |  |                    |  |
| MAY    | 359             | 118             | 0                               | 267      | 744               | 370               | 0                   | 0             | 0                | 0.000  | 27.902   |  |                    |  |
| JUN    | 709             | 0               | 0                               | 11       | 720               | 709               | 0                   | 0             | 0                | 0.000  | 25.910   |  |                    |  |
| JUL    | 744             | 0               | 0                               | 0        | 744               | 744               | 0                   | 0             | 0                | 0.000  | 26.299   |  |                    |  |
| AUG    | 743             | 0               | 0                               | 1        | 744               | 743               | 0                   | 0             | 0                | 0.000  | 26.923   |  |                    |  |
| SEP    | 600             | 0               | 0                               | 120      | 720               | 630               | 0                   | 0             | 0                | 0.000  | 26.058   |  |                    |  |
| OCT    | 13              | 245             | 0                               | 486      | 744               | 16                | 0                   | 0             | 0                | 0.000  | 22.808   |  |                    |  |
| NOV    | 0               | 241             | 0                               | 479      | 720               | 0                 | 0                   | 0             | 0                | 0.000  | 4.316  |  |                    |  |
| DEC    | 0               | 344             | 0                               | 400      | 744               | 0                 | 0                   | 0             | 0                | -28.609  | 4.316  |  |                    |  |
| ANNUAL | 3168            | 2090            | 0                               | 3502     | 5424              | 3212              | 0                   | 0             | 0                | -66.422  |  |  |                    |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 13:24:51 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION BLDG. 8069-R THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|-----|--|---|---|
| JAN | 137.829<br>224.556<br>15/ 9                      | 214.154<br>1618.936<br>15/ 5                        |   |
| FEB | 123.736<br>220.812<br>2/ 7                       | 164.058<br>1463.770<br>3/ 5                         |   |
| MAR | 136.810<br>220.389<br>7/22                       | 136.740<br>1188.464<br>4/ 5                         |   |
| APR | 129.578<br>220.269<br>7/22                       | 56.399<br>729.944<br>5/ 5                           |   |
| MAY | 139.108<br>271.153<br>16/15                      | 16.503<br>521.474<br>1/ 5                           |   |
| JUN | 143.083<br>258.709<br>28/15                      | 0.000<br>0.000<br>30/ 1                             |   |
| JUL | 149.066<br>263.592<br>23/16                      | 0.000<br>0.000<br>31/ 1                             |   |
| AUG | 151.181<br>263.083<br>11/16                      | 0.000<br>0.000<br>31/ 1                             |   |
| SEP | 138.025<br>259.582<br>6/16                       | 0.000<br>0.000<br>30/ 1                             |   |
| OCT | 132.825<br>248.703<br>1/17                       | 46.291<br>810.760<br>20/ 5                          |   |
| NOV | 131.289<br>220.147<br>11/18                      | 111.831<br>1137.251<br>3/ 5                         |   |
| DEC | 136.989<br>222.817<br>12/ 6                      | 189.542<br>1407.030<br>14/24                        |   |
|     | ONE YEAR<br>USE/PEAK                             | 1649.519<br>271.153                                 | 935.518<br>1618.936                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 13:24:51 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION BLDG. 8069-R THE REMAINDER OF THE BLDG. (LESS POOL)  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 34.63       | 935.52      |
| SPACE COOL                                       | 79.13       | 0.00        |
| HVAC AUX   | 955.19      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 580.45      | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 0.00        | 0.00        |
| TOTAL  | 1649.40     | 935.52      |

TOTAL SITE ENERGY 2585.04 MBTU 118.2 KBTU/SQFT-YR GROSS-AREA 118.2 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 5889.03 MBTU 269.4 KBTU/SQFT-YR GROSS-AREA 269.4 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 1.1  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

**COMPUTER ENERGY SIMULATIONS**

**BLDG. 6914  
RETAIL BUILDINGS**





DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

BUILDING NO.:  
BLDG. TYPE:

6914  
MAIN POST EXCHANGE

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

### ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3    | RUN4    | RUN5    |
|----------------|---------|---------|---------|---------|---------|---------|
| HEATING (MBtu) | 3577.3  | 2568.5  | 3050.3  | 1345.8  | 2518.0  | 449.2   |
| COOLING (kWH)  | 775,716 | 727,231 | 738,614 | 682,359 | 761,570 | 670,155 |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 29,224 CFM                        |
| FLOOR AREA     | 26,443 FT <sup>2</sup>            |
| CFMI           | 16658 CFM                         |
| UA             | 2542 BTU/HR.°F                    |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

#### EZDOE COMPUTER RUN DEFINITION:

|         |                             |
|---------|-----------------------------|
| BASERUN | EXISTING OPERATION          |
| RUN1    | NIGHT SETBACK               |
| RUN2    | DDC CONTROL                 |
| RUN3    | ECONOMIZER                  |
| RUN4    | NIGHTTIME INFILTRATION (OA) |
| RUN5    | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      |            | ANNUAL HEATING & COOLING HOURS |            |
|--------------------|-------------------|------|------------|--------------------------------|------------|
| M-F                | 800               | 2200 | 70 HR      | HR. ON HEATING                 | 3178 HR/YR |
| SAT.               | 800               | 2200 | 14 HR      | HR. ON COOLING                 | 1932 HR/YR |
| SUN.               | 800               | 2200 | 14 HR      | HR. OFF HEATING                | 2270 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 98 HR/WK   | HR. OFF COOLING                | 1380 HR/YR |
|                    | TOTAL UNOCC. HR.  |      | 70 HR/WK   |                                |            |
|                    | ANNUAL OCCUPY HR. |      | 5110 HR/YR |                                |            |
|                    | ANNUAL UNOCC. HR. |      | 3650 HR/YR |                                |            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING

8760 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY

5448 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

3312 HR/YR

HRS SAVED (HTG ONLY)

5448

3178

=

2270 HR/YR

HRS SAVED (CLG ONLY)

3312

1932

=

1380 HR/YR

|           |   |   |               |           |                     |
|-----------|---|---|---------------|-----------|---------------------|
| HOAUHC    | 3577.28 MBtu  | - | 2518.01 MBtu  | =         | 1.74E+01 Btu/CFM-HR |
|           | 16657.68 CFM  | x | 3650 HR/YR    |           |                     |
| HOAUH     | 3577.28 MBtu  | - | 2518.01 MBtu  | =         | 2.80E+01 Btu/CFM-HR |
|           | 16657.68 CFM  | x | 2270 HR/YR    |           |                     |
| COAUHC    | 775,716.4 kWH   | - | 761,570.5 kWH | =         | 2.33E-04 kWH/CFM-HR |
|           | 16657.68 CFM  | x | 3650 HR/YR    |           |                     |
| COAUC     | 775,716.4 kWH   | - | 761,570.5 kWH | =         | 6.15E-04 kWH/CFM-HR |
|           | 16657.68 CFM  | x | 1380 HR/YR    |           |                     |
| HOAOHC    | 3577.28 MBtu  | - | 449.17 MBtu   | =         | 3.67E+01 Btu/CFM-HR |
|           | 16657.68 CFM  | x | 5110 HR/YR    |           |                     |
| HOAOH     | 3577.28 MBtu  | - | 449.17 MBtu   | =         | 5.91E+01 Btu/CFM-HR |
|           | 16657.68 CFM  | x | 3178 HR/YR    |           |                     |
| COAOHC    | 775,716.4 kWH   | - | 670,155.3 kWH | =         | 1.24E-03 kWH/CFM-HR |
|           | 16657.68 CFM  | x | 5110 HR/YR    |           |                     |
| COAOC     | 775,716.4 kWH   | - | 670,155.3 kWH | =         | 3.28E-03 kWH/CFM-HR |
|           | 16657.68 CFM  | x | 1932 HR/YR    |           |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | =         | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | =         | 0.17                |
| ECC       | 727,231.2 kWH   | - | 682,358.6 kWH | =         | 7.95E-04 kWH/CFM-HR |
|           | 29224 CFM   | x | 1932 HR/YR    |           |                     |
| ECHC      | 727,231.2 kWH   | - | 682,358.6 kWH | =         | 3.00E-04 kWH/CFM-HR |
|           | 29224 CFM   | x | 5110 HR/YR    |           |                     |
| NSUCHC    | 775,716.4 kWH   | - | 727,231.2 kWH | =         | 4.55E-04 kWH/CFM-HR |
|           | 29224 CFM   | x | 3650 HR/YR    |           |                     |
| NSUCC     | 775,716.4 kWH   | - | 727,231.2 kWH | =         | 1.20E-03 kWH/CFM-HR |
|           | 29224 CFM   | x | 1380 HR/YR    |           |                     |
| DDCCHC    | 775,716.4 kWH   | - | 738,614.1 kWH | =         | 2.48E-04 kWH/CFM-HR |
|           | 29224 CFM   | x | 5110 HR/YR    |           |                     |
| DDCCC     | 775,716.4 kWH   | - | 738,614.1 kWH | =         | 6.57E-04 kWH/CFM-HR |
|           | 29224 CFM   | x | 1932 HR/YR    |           |                     |
| NSC       | 3577.28 MBtu  | - | 2568.47 MBtu  | =         | 3.97E+05 Btu/UA     |
|           | 2541.5924 UA  |   |               |           |                     |
| DDCH      | 3577.28 MBtu  | - | 3050.34 MBtu  | =         | 2.07E+05 Btu/UA     |
|           | 2541.5924 UA  |   |               |           |                     |
| OPT       | (2 HR/DAY X 240 DAY/YR)                               |   |               | 175 HR/YR |                     |
|           |   |   |               | =         | 305 HR/YR           |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               |           |                     |
|           |   |   |               | =         | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01          | =         | 5.67 HR/YR          |



INPUT LOADS ..

```

$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

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## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BLDG. #6914      *
        LINE-5 *MAIN FLOOR OF MAIN POST EXCHANGE      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
LOADS-REPORT VERIFICATION=(LV-D)
            SUMMARY=(LS-C,LS-D)
            HOURLY-DATA-SAVE = YES ..
BUILDING-LOCATION LATITUDE = 39.0
                LONGITUDE = 96.5
                ALTITUDE = 1065.
                TIME-ZONE = 6
                GROSS-AREA = 26442.5
                SHIELDING-COEF = 0.29
                X-REF = 0.0
                Y-REF = 0.0 ..
RUN-PERIOD  JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

```

LD_PE-SUN  =DAY-SCHEDULE  (1,7) (0.)
                        (8,9) (0.15)
                        (10,19) (1.)
                        (20,22) (0.15)
                        (23,24) (0.) ..

LD_LT-WEEK =DAY-SCHEDULE  (1,6) (0.05)
                        (7,24) (1.) ..

LD_ON      =DAY-SCHEDULE  (1,24) (1.) ..

LD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..

LD_PE-WEEK =DAY-SCHEDULE  (1,6) (0.)
                        (7,8) (0.15)
                        (9,21) (1.)
                        (22,24) (0.15) ..

LD_LT-SUN  =DAY-SCHEDULE  (1,7) (0.05)
                        (8,22) (1.)
                        (23,24) (0.05) ..

```

LW\_ON =WEEK-SCHEDULE (ALL) LD\_ON ..

LW\_OFF =WEEK-SCHEDULE (ALL) LD\_OFF ..

LW\_PEOPLE =WEEK-SCHEDULE (WD) LD\_PE-WEEK  
(SAT) LD\_PE-WEEK  
(SUN) LD\_PE-SUN  
(HOL) LD\_PE-SUN ..

LW\_LITES =WEEK-SCHEDULE (WD) LD\_LT-WEEK  
(SAT) LD\_LT-WEEK  
(SUN) LD\_LT-SUN  
(HOL) LD\_LT-SUN ..

\$ ON 100% OF THE TIME

L\_ON =SCHEDULE THRU DEC 31 LW\_ON ..

\$ OFF 100% OF THE TIME

L\_OFF =SCHEDULE THRU DEC 31 LW\_OFF ..

\$ PEOPLE LOAD

L\_PEOPLE =SCHEDULE THRU DEC 31 LW\_PEOPLE ..

\$ LIGHTING LOAD FOR PX

L\_LITES =SCHEDULE THRU DEC 31 LW\_LITES ..

#### \$ CONSTRUCTION TYPES

\$ EXTERIOR WALL BRICK, INSL, CMU

WALL-1 =LAYERS MATERIAL=(BK01,IN43,CB31) I-F-R= 0.6100  
THICKNESS=(0.333,0.083,0.667) ..

EXWALL-1 =CONSTRUCTION LAYERS = WALL-1  
ABSORPTANCE = 0.880  
ROUGHNESS = 2 ..

FLOOR =CONSTRUCTION U-VALUE = 0.020  
ABSORPTANCE = 0.610  
ROUGHNESS = 5 ..

\$ BUILT-UP ROOF WITH INSL=R-16.3

INSLATRF =LAYERS MATERIAL=(HF-E2,IN02,IN34,PW05,AL33,AC01)  
THICKNESS=(0.042,0.296,0.104,0.063,0.000,0.031) ..

ROOF-1 =CONSTRUCTION LAYERS = INSLATRF  
ABSORPTANCE = 0.800  
ROUGHNESS = 1 ..

\$ EXTERIOR WALL W/ ASBESTOS FACIA

WALL-2 =LAYERS MATERIAL=(CM01,AL31,IN37) I-F-R= 0.6100  
THICKNESS=(0.083,0.000,0.333) ..

EXWALL-2 =CONSTRUCTION    LAYERS = WALL-2  
                              ABSORPTANCE = 0.610  
                              ROUGHNESS = 2    ..

## \$ STANDARD METAL DOOR

DOOR-STD =LAYERS            MATERIAL=(HF-A3,IN44,HF-A3)    I-F-R= 0.6100  
                              THICKNESS=(0.005,0.104,0.005)    ..

DOOR-MET =CONSTRUCTION    LAYERS = DOOR-STD  
                              ABSORPTANCE = 0.860  
                              ROUGHNESS = 5    ..

2\_PN\_STD =GLASS-TYPE       GLASS-TYPE-CODE = 4  
                              PANES = 2    ..

## \$ SPACE DESCRIPTION

MAIN-SALES =SPACE    AREA = 26442.5    VOLUME = 522239.5  
                              TEMPERATURE = (73.)    ZONE-TYPE = CONDITIONED  
                              PEOPLE-SCHEDULE = L\_PEOPLE    NUMBER-OF-PEOPLE = 65.0  
                              PEOPLE-HG-LAT = 625.0    PEOPLE-HG-SENS = 375.0  
                              LIGHTING-TYPE = REC-FLUOR-RSV    LIGHTING-W/SQFT = 2.46  
                              LIGHT-TO-SPACE = 1.0    LIGHTING-SCHEDULE = L\_LITES  
                              SOURCE-SENSIBLE = 0.0    FURN-WEIGHT = 2.5  
                              INF-METHOD = NONE    ..

E-W            HEIGHT = 14.0    WIDTH = 98.0    CONS = EXWALL-1  
                              AZIMUTH = 302    SKY-FORM-FACTOR = 0.5  
                              GND-FORM-FACTOR = 0.5    ..

WINDOW HEIGHT = 2.0    WIDTH = 6.5    G-T = 2\_PN\_STD  
                              MULTIPLIER = 5.0    SKY-FORM-FACTOR = 0.5  
                              GND-FORM-FACTOR = 0.5    OVERHANG-A = 10.  
                              OVERHANG-B = 6.    OVERHANG-W = 32.    OVERHANG-D = 10.    ..

WINDOW HEIGHT = 7.0    WIDTH = 3.0    G-T = 2\_PN\_STD  
                              MULTIPLIER = 4.0    SKY-FORM-FACTOR = 0.5  
                              GND-FORM-FACTOR = 0.5    OVERHANG-A = 10.  
                              OVERHANG-B = 6.    OVERHANG-W = 32.    OVERHANG-D = 10.    ..

WINDOW HEIGHT = 6.0    WIDTH = 2.3    G-T = 2\_PN\_STD  
                              MULTIPLIER = 6.0    SKY-FORM-FACTOR = 0.5  
                              GND-FORM-FACTOR = 0.5    OVERHANG-A = 10.  
                              OVERHANG-B = 6.    OVERHANG-W = 32.    OVERHANG-D = 10.    ..

E-W            HEIGHT = 6.0    WIDTH = 98.0    CONS = EXWALL-2  
                              AZIMUTH = 302    SKY-FORM-FACTOR = 0.5  
                              GND-FORM-FACTOR = 0.5    ..

E-W            HEIGHT = 19.8    WIDTH = 42.0    CONS = EXWALL-1  
                              AZIMUTH = 32    SKY-FORM-FACTOR = 0.5  
                              GND-FORM-FACTOR = 0.5    ..

WINDOW HEIGHT = 8.0    WIDTH = 6.0    G-T = 2\_PN\_STD

SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-B = 6. OVERHANG-W = 32.  
 OVERHANG-D = 10. ..

E-W HEIGHT = 19.8 WIDTH = 36.0 CONS = EXWALL-1  
 AZIMUTH = 122 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 19.8 WIDTH = 138.0 CONS = EXWALL-1  
 AZIMUTH = 212 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.0 WIDTH = 3.0 CONS = DOOR-MET  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-B = 6. OVERHANG-W = 32.  
 OVERHANG-D = 10. ..

U-W HEIGHT = 155.5 WIDTH = 170.0 CONS = FLOOR ..

ROOF HEIGHT = 155.5 WIDTH = 170.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*BASELINE SIMULATION FOR BLDG. #6914 \*  
 LINE-5 \*MAIN FLOOR OF MAIN POST EXCHANGE \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,24) (76.) ..  
 SD\_SM\_HT =DAY-SCHEDULE (1,24) (70.) ..

SD\_OA% =DAY-SCHEDULE (1,24) (0.57) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..

SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..

SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..

SW\_OA% =WEEK-SCHEDULE (ALL) SD\_OA% ..

# \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

# \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

# \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
THRU OCT 1 SW\_OFF  
THRU DEC 31 SW\_ON ..

# \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

# \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

# \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
THRU JAN 15 SW\_ON  
THRU JUL 22 SW\_OFF  
THRU JUL 23 SW\_ON  
THRU DEC 31 SW\_OFF ..

# \$ ZONE DESCRIPTION

MAIN-SALES =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0

HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

LARG-SZ =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED OA-CONTROL = FIXED  
 SUPPLY-CFM = 28100. RATED-CFM = 28100.  
 MIN-OUTSIDE-AIR = 0.57 MIN-AIR-SCH = S\_OA%  
 MAX-OA-FRACTION = 0.57 SUPPLY-DELTA-T = 1.8  
 SUPPLY-KW = 0.00059  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 1328568.  
 COOL-SH-CAP = 1107140. COOL-FT-MIN = 0.  
 HEATING-CAPACITY = -1800000. MIN-HP-T = 0.  
 MAX-HP-SUPP-T = 0. CRANKCASE-MAX-T = 0.  
 OUTSIDE-FAN-T = 45. HEAT-SOURCE = HOT-WATER  
 SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (MAIN-SALES) ..

## \$ HOURLY REPORT DESCRIPTION

AHU-BLK =REPORT-BLOCK VARIABLE-TYPE = LARG-SZ  
 VARIABLE-LIST = (3,5,6,17,39,1) ..  
 ZONE-BLK =REPORT-BLOCK VARIABLE-TYPE = MAIN-SALES  
 VARIABLE-LIST = (17,18,7,6) ..  
 AHU-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (AHU-BLK)  
 ..  
 ZONE-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONE-BLK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..

INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*BASELINE SIMULATION FOR BLDG. #6914 \*



LINE-5 \*MAIN FLOOR OF MAIN POST EXCHANGE \* ..

ABORT                ERRORS    ..  
DIAGNOSTIC           WARNINGS ..  
PLANT-REPORT        VERIFICATION=(PV-A)  
                     SUMMARY=(PS-B,BEPS)  
                     HOURLY-DATA-SAVE = YES    ..

## \$ SCHEDULES

PD\_ON        =DAY-SCHEDULE (1,24) (1.) ..

PD\_OFF       =DAY-SCHEDULE (1,24) (0.) ..

PW\_ON        =WEEK-SCHEDULE (ALL) PD\_ON    ..

PW\_OFF       =WEEK-SCHEDULE (ALL) PD\_OFF    ..

## \$ HEATING SEASON

P\_HEAT       =SCHEDULE THRU MAY 15 PW\_ON  
                     THRU OCT 1 PW\_OFF  
                     THRU DEC 31 PW\_ON    ..

## \$ COOLING SEASON

P\_COOL       =SCHEDULE THRU MAY 15 PW\_OFF  
                     THRU OCT 1 PW\_ON  
                     THRU DEC 31 PW\_OFF    ..

## \$ EQUIPMENT DESCRIPTION

BOIL-HW      =PLANT-EQUIPMENT    TYPE = HW-BOILER  
                     SIZE = -999.    ..

CHILL-RECP =PLANT-EQUIPMENT    TYPE = HERM-REC-CHLR  
                     SIZE = -999.    INSTALLED-NUMBER = 4  
                     MAX-NUMBER-AVAIL = 4    ..

PLANT-PARAMETERS    BOILER-FUEL = NATURAL-GAS    HERM-REC-COND-TYPE = AIR  
                     COMP-TO-TWR-WTR = 2.3    CHILL-WTR-T = 45.  
                     CCIRC-HEAD = 50.0    HCIRC-HEAD = 58.0  
                     HCIRC-DESIGN-T-DROP = 20.0    ..

ENERGY-RESOURCE      RESOURCE = ELECTRICITY    ..  
ENERGY-RESOURCE      RESOURCE = NATURAL-GAS    ..

HEAT-SEASO =LOAD-ASSIGNMENT    TYPE = HEATING  
                     OPERATION-MODE = RUN-NEEDED  
  
                     LOAD-RANGE =    0.000  
                     PLANT-EQUIPMENT = BOIL-HW  
                     NUMBER =    1    ..

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COOL-SEASO =LOAD-ASSIGNMENT TYPE = COOLING  
OPERATION-MODE = RUN-NEEDED  
  
LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = CHILL-RECP  
NUMBER = 4 ..

END ..  
COMPUTE PLANT ..  
STOP ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 14:31:25 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

NUMBER OF EXTERIOR SURFACES 6 RECTANGULAR 6 OTHER 0  
 (U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED )

| SURFACE    | SPACE | U-VALUE<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | WALL<br>AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | WALL<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) | AZIMUTH   |
|------------|-------|----------------------------|-------------------------|----------------------------|------------------------|----------------------------|-------------------------|----------------------------|------------------------|--------------------------------|-----------|
| MAIN-SALES |       | 0.490                      | 48.00                   | 0.104                      | 783.60                 | 0.127                      | 831.60                  | 0.127                      | 831.60                 | 831.60                         | NORTH     |
| MAIN-SALES |       | 0.000                      | 0.00                    | 0.104                      | 712.80                 | 0.104                      | 712.80                  | 0.104                      | 712.80                 | 712.80                         | EAST      |
| MAIN-SALES |       | 0.000                      | 0.00                    | 0.104                      | 2732.40                | 0.104                      | 2732.40                 | 0.104                      | 2732.40                | 2732.40                        | SOUTH     |
| MAIN-SALES |       | 0.000                      | 0.00                    | 0.054                      | 588.00                 | 0.054                      | 588.00                  | 0.054                      | 588.00                 | 588.00                         | WEST      |
| MAIN-SALES |       | 0.490                      | 231.80                  | 0.104                      | 1140.20                | 0.169                      | 1372.00                 | 0.169                      | 1372.00                | 1372.00                        | ROOF      |
| MAIN-SALES |       | 0.000                      | 0.00                    | 0.048                      | 26435.00               | 0.048                      | 26435.00                | 0.048                      | 26435.00               | 26435.00                       | ROOF      |
| MAIN-SALES |       | 0.000                      | 0.00                    | 0.020                      | 26435.00               | 0.020                      | 26435.00                | 0.020                      | 26435.00               | 26435.00                       | UNDERGRND |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 14:31:25 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

|             | AVERAGE<br>U-VALUE/GLASS<br>(BTU/HR-SQFT-F) | AVERAGE<br>U-VALUE/WALLS<br>(BTU/HR-SQFT-F) | AVERAGE U-VALUE<br>WALLS+GLASS<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | OPAQUE<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) |
|-------------|---|---|---|-------------------------|--------------------------|--------------------------------|
| NORTH       | 0.490                                       | 0.104                                       | 0.127   | 48.00                   | 783.60                   | 831.60                         |
| EAST        | 0.000                                       | 0.104                                       | 0.104   | 0.00                    | 712.80                   | 712.80                         |
| SOUTH       | 0.000                                       | 0.104                                       | 0.104   | 0.00                    | 2732.40                  | 2732.40                        |
| WEST        | 0.490                                       | 0.087                                       | 0.135   | 231.80                  | 1728.20                  | 1960.00                        |
| ROOF        | 0.000                                       | 0.048                                       | 0.048   | 0.00                    | 26435.00                 | 26435.00                       |
| ALL WALLS   | 0.490                                       | 0.099                                       | 0.117   | 279.80                  | 5957.00                  | 6236.80                        |
| WALLS+ROOFS | 0.490                                       | 0.058                                       | 0.061   | 279.80                  | 32392.00                 | 32671.80                       |
| UNDERGRND   | 0.000                                       | 0.020                                       | 0.020   | 0.00                    | 26435.00                 | 26435.00                       |
| BUILDING    | 0.490                                       | 0.041                                       | 0.043   | 279.80                  | 58827.00                 | 59106.80                       |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 14:31:25 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #5914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS

\*\*\* BUILDING \*\*\*

FLOOR AREA 26443 SQFT 2457 SQMT  
 VOLUME 522240 CUFT 14790 CUMT

COOLING LOAD  
 =====  
 TIME DRY-BULB TEMP WET-BULB TEMP  
 AUG 4 6PM 92F 33C  
 70F 21C  
 HEATING LOAD  
 =====  
 JAN 15 6AM -8F -22C  
 -9F -23C

|                      | SENSIBLE<br>(KBTU/H) | ( KW ) | LATENT<br>(KBTU/H) | ( KW )   | SENSIBLE<br>(KBTU/H) | ( KW )  | W / SQMT |
|----------------------|----------------------|--------|--------------------|----------|----------------------|---------|----------|
| WALLS                | 2.223                | 0.651  | 0.000              | 0.000    | -44.128              | -12.924 |          |
| ROOFS                | 78.271               | 22.924 | 0.000              | 0.000    | -108.037             | -31.641 |          |
| GLASS CONDUCTION     | 1.678                | 0.491  | 0.000              | 0.000    | -10.634              | -3.114  |          |
| GLASS SOLAR          | 5.935                | 1.738  | 0.000              | 0.000    | 0.426                | 0.125   |          |
| DOOR                 | 0.134                | 0.039  | 0.000              | 0.000    | -0.411               | -0.120  |          |
| INTERNAL SURFACES    | 0.000                | 0.000  | 0.000              | 0.000    | 0.000                | 0.000   |          |
| UNDERGROUND SURFACES | -2.501               | -0.733 | 0.000              | 0.000    | -15.180              | -4.446  |          |
| OCCUPANTS TO SPACE   | 22.693               | 6.646  | 40.625             | 11.898   | 2.434                | 0.713   |          |
| LIGHT TO SPACE       | 218.531              | 64.002 | 0.000              | 0.000    | 24.112               | 7.062   |          |
| EQUIPMENT TO SPACE   | 0.000                | 0.000  | 0.000              | 0.000    | 0.000                | 0.000   |          |
| PROCESS TO SPACE     | 0.000                | 0.000  | 0.000              | 0.000    | 0.000                | 0.000   |          |
| INFILTRATION         | 0.000                | 0.000  | 0.000              | 0.000    | 0.000                | 0.000   |          |
| TOTAL                | 326.964              | 95.759 | 40.625             | 11.898   | -151.416             | -44.346 |          |
| TOTAL LOAD           | 367.589              | KBTU/H | 107.658            | KW       | -151.416             | KBTU/H  | KW       |
| TOTAL LOAD / AREA    | 13.90BTU/H.SQFT      |        | 43.824             | W / SQMT | 5.726BTU/H.SQFT      |         | W / SQMT |

\*\*\*\*\*  
 \* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR \*  
 \* LOADS \*  
 \* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION \*  
 \* IN CONSIDERATION \*  
 \*\*\*\*\*

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 14:31:25 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR LARG-SZ TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |   |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | MAXIMUM<br>ELEC-<br>TRICAL<br>ENERGY<br>(KWH) |
| JAN   | 0.00000                     |                         |                      |                      | -574.911                    | 15                      | -8.F                 | -9.F                 | -1670.903                               | 48299.  |
| FEB   | 0.00000                     |                         |                      |                      | -433.854                    | 3                       | -1.F                 | -2.F                 | -1485.713                               | 43532.  |
| MAR   | 0.00000                     |                         |                      |                      | -348.525                    | 4                       | 14.F                 | 12.F                 | -1169.887                               | 48480.  |
| APR   | 0.00000                     |                         |                      |                      | -117.813                    | 5                       | 31.F                 | 28.F                 | -798.241                                | 46892.  |
| MAY   | 107.99516                   | 31                      | 18                   | 90.F                 | -29.812                     | 1                       | 37.F                 | 37.F                 | -620.304                                | 58468.  |
| JUN   | 336.14935                   | 27                      | 16                   | 89.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 79274.  |
| JUL   | 469.78516                   | 23                      | 17                   | 97.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 93225.  |
| AUG   | 461.75812                   | 20                      | 14                   | 93.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 94624.  |
| SEP   | 206.15425                   | 5                       | 18                   | 90.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 66734.  |
| OCT   | 2.80517                     | 1                       | 18                   | 83.F                 | -105.446                    | 20                      | 24.F                 | 23.F                 | -929.636                                | 48397.  |
| NOV   | 0.00000                     |                         |                      |                      | -284.563                    | 3                       | 13.F                 | 12.F                 | -1166.867                               | 46522.  |
| DEC   | 0.00000                     |                         |                      |                      | -508.530                    | 13                      | 2.F                  | 1.F                  | -1421.705                               | 48295.  |
| TOTAL | 1584.647                    |                         |                      |                      | -2403.450                   |                         |                      |                      | -1670.903                               | 722768.                                       |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   | 229.525                                       |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 14:31:25 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR LARG-SZ TOPEKA, KS

| MONTH  | HOURS           |                 |                   |          | HOURS             |                   |         |                  | HOURS            |                  |                                       |  | COINCIDENT LOADS                      |  |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|---------|------------------|------------------|------------------|---------------------------------------|--|---------------------------------------|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | FANS ON<br>CYCLE | NIGHT<br>VENTING | FLOATING<br>WHEN | HEATING<br>LOAD AT<br>COOLING<br>PEAK | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK | HEATING<br>LOAD AT<br>COOLING<br>PEAK | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK |
| JAN    | 0               | 744             | 0                 | 0        | 744               | 0                 | 744     | 0                | 0                | 0                | -579.138                              | 81.600                                 | -579.138                              | 81.600                                 |
| FEB    | 0               | 672             | 0                 | 0        | 672               | 0                 | 672     | 0                | 0                | 0                | -597.308                              | 81.600                                 | -597.308                              | 81.600                                 |
| MAR    | 0               | 722             | 0                 | 22       | 744               | 0                 | 744     | 0                | 0                | 22               | -577.443                              | 81.600                                 | -577.443                              | 81.600                                 |
| APR    | 0               | 543             | 0                 | 177      | 720               | 0                 | 720     | 0                | 0                | 177              | -338.336                              | 19.830                                 | -338.336                              | 19.830                                 |
| MAY    | 294             | 226             | 0                 | 224      | 360               | 298               | 744     | 0                | 0                | 224              | 0.000                                 | 198.001                                | 0.000                                 | 198.001                                |
| JUN    | 637             | 0               | 0                 | 83       | 0                 | 641               | 720     | 0                | 0                | 83               | 0.000                                 | 201.884                                | 0.000                                 | 201.884                                |
| JUL    | 729             | 0               | 0                 | 15       | 0                 | 729               | 744     | 0                | 0                | 15               | 0.000                                 | 228.583                                | 0.000                                 | 228.583                                |
| AUG    | 712             | 0               | 0                 | 32       | 0                 | 714               | 744     | 0                | 0                | 32               | 0.000                                 | 214.036                                | 0.000                                 | 214.036                                |
| SEP    | 485             | 0               | 0                 | 235      | 0                 | 489               | 720     | 0                | 0                | 235              | 0.000                                 | 201.690                                | 0.000                                 | 201.690                                |
| OCT    | 11              | 539             | 0                 | 194      | 720               | 11                | 744     | 0                | 0                | 194              | 0.000                                 | 127.426                                | 0.000                                 | 127.426                                |
| NOV    | 0               | 657             | 0                 | 63       | 720               | 0                 | 720     | 0                | 0                | 63               | -708.968                              | 81.600                                 | -708.968                              | 81.600                                 |
| DEC    | 0               | 744             | 0                 | 0        | 744               | 0                 | 744     | 0                | 0                | 0                | -675.307                              | 81.600                                 | -675.307                              | 81.600                                 |
| ANNUAL | 2868            | 4847            | 0                 | 1045     | 5424              | 2882              | 8760    | 0                | 0                | 1045             |                                       |  |                                       |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 14:31:25 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>198.177<br>324.894<br>28/ 9 | NATURAL-GAS<br>817.247<br>2099.407<br>15/ 6 |
|-----|--|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 178.249<br>324.894<br>3/ 8                 | 638.710<br>1903.385<br>3/ 6                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 193.403<br>324.553<br>31/24                | 528.133<br>1559.740<br>4/ 6                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 174.092<br>324.553<br>16/ 8                | 191.555<br>1140.267<br>5/ 6                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 204.294<br>676.058<br>31/18                | 51.048<br>933.656<br>1/ 6                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 270.677<br>689.318<br>27/16                | 0.000<br>30/ 1<br>0.000                     |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 318.310<br>783.697<br>23/16                | 0.000<br>0.000<br>31/ 1                     |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 323.086<br>742.807<br>22/16                | 0.000<br>0.000<br>31/ 1                     |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 227.861<br>699.551<br>7/16                 | 0.000<br>0.000<br>30/ 1                     |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 178.994<br>435.673<br>1/17                 | 175.872<br>1290.436<br>20/ 6                |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 182.973<br>324.553<br>30/24                | 436.058<br>1556.397<br>3/ 6                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 197.537<br>324.894<br>13/ 8                | 738.649<br>1834.691<br>13/ 6                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |  |   |
|     | ONE YEAR<br>USE/PEAK                             | 2647.650<br>783.697                        | 3577.272<br>2099.407                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 14:31:25 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 136.34      | 3577.28     |
| SPACE COOL                                       | 526.91      | 0.00        |
| HVAC AUX   | 539.40      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 1444.87     | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 0.00        | 0.00        |
| TOTAL  | 2647.52     | 3577.28     |

TOTAL SITE ENERGY 6224.92 MBTU 235.4 KBTU/SQFT-YR GROSS-AREA 235.4 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 11528.17 MBTU 436.0 KBTU/SQFT-YR GROSS-AREA 436.0 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.





SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-B = 6. OVERHANG-W = 32.  
 OVERHANG-D = 10. ..

E-W HEIGHT = 19.8 WIDTH = 36.0 CONS = EXWALL-1  
 AZIMUTH = 122 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 19.8 WIDTH = 138.0 CONS = EXWALL-1  
 AZIMUTH = 212 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.0 WIDTH = 3.0 CONS = DOOR-MET  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-B = 6. OVERHANG-W = 32.  
 OVERHANG-D = 10. ..

U-W HEIGHT = 155.5 WIDTH = 170.0 CONS = FLOOR ..

ROOF HEIGHT = 155.5 WIDTH = 170.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

#### \$ GENERAL PROJECT DATA

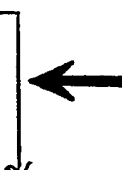
TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #1 NIGHT SETBACK FOR BLDG. #6914 \*  
 LINE-5 \*MAIN FLOOR OF MAIN POST EXCHANGE \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,5) (55.)  
 (6,24) (74.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,5) (85.)  
 (6,24) (72.) ..



```

SD_WT_CL   =DAY-SCHEDULE (1,5) (57.)
              (6,24) (76.) ..
SD_SM_HT   =DAY-SCHEDULE (1,5) (83.)
              (6,24) (70.) ..
SD_OA%     =DAY-SCHEDULE (1,24) (0.57) ..
SD_FAN_CYC =DAY-SCHEDULE (1,5) (0.)
              (6,24) (1.) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..

SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT   =WEEK-SCHEDULE (ALL) SD_WT_HT ..

SW_SM_CL   =WEEK-SCHEDULE (ALL) SD_SM_CL ..

SW_WT_CL   =WEEK-SCHEDULE (ALL) SD_WT_CL ..

SW_SM_HT   =WEEK-SCHEDULE (ALL) SD_SM_HT ..

SW_OA%     =WEEK-SCHEDULE (ALL) SD_OA% ..

SW_FAN_CYC =WEEK-SCHEDULE (ALL) SD_FAN_CYC ..

```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..
```

## \$ HEATING SEASON

```
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT 1 SW_OFF
              THRU DEC 31 SW_ON ..
```

## \$ COOLING SEASON

```
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT 1 SW_ON
              THRU DEC 31 SW_OFF ..
```

## \$ HEATING SET TEMP

```
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
              THRU OCT 1 SW_SM_HT
              THRU DEC 31 SW_WT_HT ..
```

## \$ COOLING SET TEMP

```
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
              THRU OCT 1 SW_SM_CL
              THRU DEC 31 SW_WT_CL ..
```

```
S_OA%     =SCHEDULE THRU DEC 31 SW_OA% ..
```

```
S_HRLY-RPT =SCHEDULE THRU JAN 14 SW_OFF
              THRU JAN 15 SW_ON
              THRU JUL 22 SW_OFF
```

THRU JUL 23 SW\_ON  
THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

# \$ ZONE DESCRIPTION

MAIN-SALES =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

# \$ SYSTEM DESCRIPTION

LARG-SZ =SYSTEM SYSTEM-TYPE = PSZ  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE-SCHED  
COOLING-SCHEDULE = S\_CL\_SCH OA-CONTROL = FIXED  
SUPPLY-CFM = 28100. RATED-CFM = 28100.  
MIN-OUTSIDE-AIR = 0.57 MIN-AIR-SCH = S\_OA%  
MAX-OA-FRACTION = 0.57 FAN-SCHEDULE = S\_FAN\_CYC  
SUPPLY-DELTA-T = 1.8 SUPPLY-KW = 0.00059  
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 1328568.  
COOL-SH-CAP = 1107140. COOL-FT-MIN = 0.  
HEATING-CAPACITY = -1800000. MIN-HP-T = 0.  
MAX-HP-SUPP-T = 0. CRANKCASE-MAX-T = 0.  
OUTSIDE-FAN-T = 45. HEAT-SOURCE = HOT-WATER  
SIZING-OPTION = COINCIDENT  
ZONE-NAMES = (MAIN-SALES) ..

# \$ HOURLY REPORT DESCRIPTION

AHU-BLK =REPORT-BLOCK VARIABLE-TYPE = LARG-SZ  
VARIABLE-LIST = (3,5,6,17,39,1) ..  
ZONE-BLK =REPORT-BLOCK VARIABLE-TYPE = MAIN-SALES  
VARIABLE-LIST = (17,18,7,6) ..  
AHU-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
REPORT-BLOCK = (AHU-BLK)  
..  
ZONE-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
REPORT-BLOCK = (ZONE-BLK)  
..  
END ..  
COMPUTE SYSTEMS ..  
INPUT PLANT ..

\$-----\$

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 14:45:52 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR LARG-SZ TOPEKA, KS

| MONTH | COOLING                     |                         |                      |                      | HEATING                     |                         |                      |                      | ELECTRIC                                |                           |                                 |  |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|--|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |  |
| JAN   | 0.00000                     |                         |                      |                      | -432.168                    | 15                      | -8. F                | -9. F                | -1718.277                               | 45730.                    | 81.700                          |  |
| FEB   | 0.00000                     |                         |                      |                      | -318.678                    | 3                       | -1. F                | -2. F                | -1523.296                               | 41211.                    | 81.700                          |  |
| MAR   | 0.00000                     |                         |                      |                      | -242.211                    | 4                       | 14. F                | 12. F                | -1200.550                               | 45910.                    | 81.600                          |  |
| APR   | 0.00000                     |                         |                      |                      | -64.192                     | 5                       | 31. F                | 28. F                | -813.505                                | 44406.                    | 81.600                          |  |
| MAY   | 113.39243                   | 31 18                   | 90. F                | 76. F                | -12.768                     | 1                       | 37. F                | 37. F                | -583.626                                | 56324.                    | 198.900                         |  |
| JUN   | 327.96432                   | 27 16                   | 89. F                | 77. F                | 0.000                       |                         |                      |                      | 0.000                                   | 75879.                    | 203.269                         |  |
| JUL   | 443.70926                   | 23 16                   | 98. F                | 79. F                | 0.000                       |                         |                      |                      | 0.000                                   | 88026.                    | 230.839                         |  |
| AUG   | 436.21201                   | 20 14                   | 93. F                | 78. F                | 0.000                       |                         |                      |                      | 0.000                                   | 89457.                    | 218.957                         |  |
| SEP   | 206.92751                   | 5 18                    | 90. F                | 77. F                | 0.000                       |                         |                      |                      | 0.000                                   | 64210.                    | 206.599                         |  |
| OCT   | 4.06273                     | 1 18                    | 83. F                | 68. F                | -57.141                     | 20                      | 24. F                | 23. F                | -941.457                                | 45947.                    | 135.608                         |  |
| NOV   | 0.00000                     |                         |                      |                      | -193.521                    | 3                       | 13. F                | 12. F                | -1193.552                               | 44035.                    | 81.600                          |  |
| DEC   | 0.00000                     |                         |                      |                      | -379.402                    | 13                      | 2. F                 | 1. F                 | -1459.493                               | 45725.                    | 81.700                          |  |
| TOTAL | 1532.268                    |                         |                      |                      | -1700.083                   |                         |                      |                      | -1718.277                               | 686890.                   | 230.839                         |  |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 14:45:52 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR LARG-SZ TOPEKA, KS

| MONTH  | COOLING         |                          |                            |                   | HEATING                    |                            |                     |                           | ELECTRIC                             |  |                         |                                 |
|--------|-----------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|---------------------|---------------------------|--------------------------------------|--|-------------------------|---------------------------------|
|        | COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | COOLING<br>PEAK<br>(KW) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN    | 0               | 589                      | 0                          | 155               | 744                        | 0                          | 589                 | 0                         | 0                                    | -583.235   | 81.600                  | 81.600                          |
| FEB    | 0               | 532                      | 0                          | 140               | 672                        | 0                          | 532                 | 0                         | 0                                    | -601.952   | 81.600                  | 81.600                          |
| MAR    | 0               | 567                      | 0                          | 177               | 744                        | 0                          | 589                 | 0                         | 0                                    | -581.086   | 81.600                  | 81.600                          |
| APR    | 0               | 392                      | 0                          | 328               | 720                        | 0                          | 570                 | 0                         | 0                                    | 0.000  | 3.251                   | 3.251                           |
| MAY    | 277             | 150                      | 0                          | 317               | 360                        | 361                        | 589                 | 0                         | 0                                    | 0.000  | 198.900                 | 198.900                         |
| JUN    | 549             | 0                        | 0                          | 171               | 0                          | 705                        | 570                 | 0                         | 0                                    | 0.000  | 203.269                 | 203.269                         |
| JUL    | 585             | 0                        | 0                          | 159               | 0                          | 743                        | 589                 | 0                         | 0                                    | 0.000  | 230.839                 | 230.839                         |
| AUG    | 582             | 0                        | 0                          | 162               | 0                          | 739                        | 570                 | 0                         | 0                                    | 0.000  | 215.904                 | 215.904                         |
| SEP    | 449             | 0                        | 0                          | 271               | 0                          | 600                        | 570                 | 0                         | 0                                    | 0.000  | 134.472                 | 134.472                         |
| OCT    | 13              | 385                      | 0                          | 214               | 720                        | 18                         | 589                 | 0                         | 0                                    | 0.000  | 81.600                  | 81.600                          |
| NOV    | 0               | 506                      | 0                          | 214               | 720                        | 0                          | 570                 | 0                         | 0                                    | -711.071   | 81.600                  | 81.600                          |
| DEC    | 0               | 589                      | 0                          | 155               | 744                        | 0                          | 589                 | 0                         | 0                                    | -679.472   | 81.600                  | 81.600                          |
| ANNUAL | 2455            | 3710                     | 0                          | 2595              | 5424                       | 3166                       | 6935                | 0                         | 0                                    |  |                         |                                 |
|        |                 |                          |                            |                   |                            |                            |                     |                           | 770                                  |  |                         |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 14:45:52 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>183.049<br>326.197<br>28/ 9 | NATURAL-GAS<br>623.390<br>2158.930<br>15/ 6 |
|-----|--|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 183.049<br>326.197<br>28/ 9                | 623.390<br>2158.930<br>15/ 6                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 164.572<br>326.197<br>3/ 8                 | 478.678<br>1952.494<br>3/ 6                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 178.207<br>325.855<br>31/24                | 375.152<br>1601.188<br>4/ 6                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 160.649<br>325.855<br>16/ 8                | 107.777<br>1164.116<br>5/ 6                 |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 194.889<br>679.131<br>31/18                | 22.781<br>896.378<br>1/ 6                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 259.083<br>694.047<br>27/16                | 0.000<br>0.000<br>30/ 1                     |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 300.558<br>788.183<br>23/16                | 0.000<br>0.000<br>31/ 1                     |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 305.445<br>747.611<br>22/16                | 0.000<br>0.000<br>31/ 1                     |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 219.241<br>705.417<br>7/16                 | 0.000<br>0.000<br>30/ 1                     |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 165.486<br>463.022<br>1/17                 | 97.511<br>1310.511<br>20/ 6                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 168.567<br>325.855<br>30/24                | 303.453<br>1593.438<br>3/ 6                 |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 182.382<br>326.197<br>13/ 8                | 559.734<br>1883.994<br>13/ 6                |
|     | ONE YEAR<br>USE/PEAK                             | 2482.129<br>788.183                        | 2568.475<br>2158.930                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 14:45:52 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 102.62      | 2568.47     |
| SPACE COOL      | 507.70      | 0.00        |
| HVAC AUX        | 426.84      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 1444.88     | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 0.00        | 0.00        |
| TOTAL           | 2482.04     | 2568.47     |

TOTAL SITE ENERGY 5050.60 MBTU 191.0 KBTU/SQFT-YR GROSS-AREA 191.0 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 10022.32 MBTU 379.0 KBTU/SQFT-YR GROSS-AREA 379.0 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-B = 6. OVERHANG-W = 32.  
 OVERHANG-D = 10. ..

E-W HEIGHT = 19.8 WIDTH = 36.0 CONS = EXWALL-1  
 AZIMUTH = 122 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 19.8 WIDTH = 138.0 CONS = EXWALL-1  
 AZIMUTH = 212 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.0 WIDTH = 3.0 CONS = DOOR-MET  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-B = 6. OVERHANG-W = 32.  
 OVERHANG-D = 10. ..

U-W HEIGHT = 155.5 WIDTH = 170.0 CONS = FLOOR ..

ROOF HEIGHT = 155.5 WIDTH = 170.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #2 DDC CONTROL FOR BLDG. #6914 \*  
 LINE-5 \*MAIN FLOOR OF MAIN POST EXCHANGE \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,24) (70.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,24) (76.) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_SM\_HT =DAY-SCHEDULE (1,24) (74.) ..



SD\_OA% =DAY-SCHEDULE (1,24) (0.57) ..  
 SD\_FAN\_CYC =DAY-SCHEDULE (1,24) (1.) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..

SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..

SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..

SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..

SW\_OA% =WEEK-SCHEDULE (ALL) SD\_OA% ..

SW\_FAN\_CYC =WEEK-SCHEDULE (ALL) SD\_FAN\_CYC ..

#### \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

#### \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

#### \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
                   THRU OCT 1 SW\_OFF  
                   THRU DEC 31 SW\_ON ..

#### \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
                   THRU OCT 1 SW\_ON  
                   THRU DEC 31 SW\_OFF ..

#### \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
                   THRU OCT 1 SW\_SM\_HT  
                   THRU DEC 31 SW\_WT\_HT ..

#### \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
                   THRU OCT 1 SW\_SM\_CL  
                   THRU DEC 31 SW\_WT\_CL ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
                   THRU JAN 15 SW\_ON  
                   THRU JUL 22 SW\_OFF  
                   THRU JUL 23 SW\_ON  
                   THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..



## \$ ZONE DESCRIPTION

```

MAIN-SALES =ZONE    DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
                    HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
                    ZONE-TYPE = CONDITIONED
                    THERMOSTAT-TYPE = PROPORTIONAL
                    SIZING-OPTION = FROM-LOADS  ..

```

## \$ SYSTEM DESCRIPTION

```

LARG-SZ    =SYSTEM    SYSTEM-TYPE = PSZ
                    MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
                    HEATING-SCHEDULE = S_HE-SCHED
                    COOLING-SCHEDULE = S_CL_SCHED  OA-CONTROL = FIXED
                    SUPPLY-CFM = 28100.  RATED-CFM = 28100.
                    MIN-OUTSIDE-AIR = 0.57  MIN-AIR-SCH = S_OA%
                    MAX-OA-FRACTION = 0.57  FAN-SCHEDULE = S_FAN_CYC
                    SUPPLY-DELTA-T = 1.8  SUPPLY-KW = 0.00059
                    MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
                    NIGHT-CYCLE-CTRL = STAY-OFF  NIGHT-VENT-DT = 0.0
                    MIN-CFM-RATIO = 1.0  COOLING-CAPACITY = 1328568.
                    COOL-SH-CAP = 1107140.  COOL-FT-MIN = 0.
                    HEATING-CAPACITY = -1800000.  MIN-HP-T = 0.
                    MAX-HP-SUPP-T = 0.  CRANKCASE-MAX-T = 0.
                    OUTSIDE-FAN-T = 45.  HEAT-SOURCE = HOT-WATER
                    SIZING-OPTION = COINCIDENT
                    ZONE-NAMES = (MAIN-SALES)  ..

```

## \$ HOURLY REPORT DESCRIPTION

```

AHU-BLK    =REPORT-BLOCK VARIABLE-TYPE = LARG-SZ
                    VARIABLE-LIST = (3,5,6,17,39,1)  ..
ZONE-BLK    =REPORT-BLOCK VARIABLE-TYPE = MAIN-SALES
                    VARIABLE-LIST = (17,18,7,6)  ..
AHU-HRLY    = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                    REPORT-BLOCK = (AHU-BLK)
..
ZONE-HRLY    = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                    REPORT-BLOCK = (ZONE-BLK)
..
END  ..
COMPUTE SYSTEMS  ..

INPUT PLANT  ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 14:56:43 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR LARG-SZ TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -516.178                    | 15                      | -8.F                 | -9.F                 | -1590.946                               | 48299.                             | 81.700                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -380.972                    | 3                       | -1.F                 | -2.F                 | -1406.446                               | 43532.                             | 81.700                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -291.787                    | 4                       | 14.F                 | 12.F                 | -1090.250                               | 48480.                             | 81.600                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -82.176                     | 5                       | 31.F                 | 28.F                 | -718.287                                | 46892.                             | 81.600                          |
| MAY   | 75.60682                    | 31                      | 18                   | 90.F                 | 1013.530                                | -16.567                     | 1                       | 37.F                 | 37.F                 | -498.938                                | 55574.                             | 186.583                         |
| JUN   | 262.43298                   | 27                      | 17                   | 89.F                 | 1064.041                                | 0.000                       |                         |                      |                      | 0.000                                   | 72445.                             | 190.256                         |
| JUL   | 381.40594                   | 23                      | 17                   | 97.F                 | 1263.140                                | 0.000                       |                         |                      |                      | 0.000                                   | 85096.                             | 218.261                         |
| AUG   | 382.51929                   | 22                      | 16                   | 96.F                 | 1156.679                                | 0.000                       |                         |                      |                      | 0.000                                   | 87094.                             | 207.903                         |
| SEP   | 150.90594                   | 7                       | 16                   | 93.F                 | 1050.148                                | -67.478                     | 20                      | 24.F                 | 23.F                 | -850.363                                | 61620.                             | 194.032                         |
| OCT   | 0.80208                     | 1                       | 18                   | 83.F                 | 232.966                                 | -234.187                    | 3                       | 13.F                 | 12.F                 | -1088.312                               | 48198.                             | 107.246                         |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -449.568                    | 13                      | 2.F                  | 1.F                  | -1342.147                               | 46522.                             | 81.600                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -----                       |                         |                      |                      | -----                                   | 48295.                             | 81.700                          |
| TOTAL | 1253.672                    |                         |                      |                      | 1263.140                                | -2038.914                   |                         |                      |                      | -1590.946                               | 692072.                            | 218.261                         |
| MAX   |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 14:56:43 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR LARG-SZ TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |                            |                   | C O I N C I D E N T L O A D S |                            |                              |                                   |
|--------|---------------------------|--------------------------|----------------------------|-------------------|-------------------------------|----------------------------|------------------------------|-----------------------------------|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL.    | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>FLOTTING<br>WHEN FANS ON |
| JAN    | 0                         | 744                      | 0                          | 0                 | 744                           | 0                          | 0                            | 0                                 |
| FEB    | 0                         | 667                      | 0                          | 5                 | 672                           | 0                          | 0                            | 5                                 |
| MAR    | 0                         | 703                      | 0                          | 41                | 744                           | 0                          | 0                            | 41                                |
| APR    | 0                         | 495                      | 0                          | 225               | 720                           | 0                          | 0                            | 225                               |
| MAY    | 230                       | 205                      | 0                          | 309               | 744                           | 231                        | 0                            | 309                               |
| JUN    | 566                       | 0                        | 0                          | 154               | 720                           | 574                        | 0                            | 154                               |
| JUL    | 675                       | 0                        | 0                          | 69                | 744                           | 680                        | 0                            | 69                                |
| AUG    | 674                       | 0                        | 0                          | 70                | 744                           | 677                        | 0                            | 70                                |
| SEP    | 396                       | 0                        | 0                          | 324               | 720                           | 401                        | 0                            | 324                               |
| OCT    | 5                         | 495                      | 0                          | 244               | 720                           | 5                          | 0                            | 244                               |
| NOV    | 0                         | 631                      | 0                          | 89                | 720                           | 0                          | 0                            | 89                                |
| DEC    | 0                         | 742                      | 0                          | 2                 | 744                           | 0                          | 0                            | 2                                 |
| ANNUAL | 2546                      | 4682                     | 0                          | 1532              | 5424                          | 2568                       | 0                            | 1532                              |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 14:56:43 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (KWH)<br>PEAK (KW)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|-----|--|--|---|
| JAN | 195.922<br>322.696<br>28/ 9                      | 195.922<br>322.696<br>28/ 9                      | 738.405<br>1998.945<br>15/ 6                        |
| FEB | 176.055<br>322.696<br>3/ 8                       | 176.055<br>322.696<br>3/ 8                       | 566.719<br>1803.560<br>3/ 6                         |
| MAR | 189.934<br>322.355<br>31/24                      | 189.934<br>322.355<br>31/24                      | 445.429<br>1458.888<br>4/ 6                         |
| APR | 170.843<br>322.355<br>16/ 7                      | 170.843<br>322.355<br>16/ 7                      | 135.342<br>1037.549<br>5/ 6                         |
| MAY | 193.074<br>637.073<br>31/18                      | 193.074<br>637.073<br>31/18                      | 29.626<br>781.036<br>1/ 6                           |
| JUN | 247.360<br>649.614<br>27/17                      | 247.360<br>649.614<br>27/17                      | 0.000<br>0.000<br>30/ 1                             |
| JUL | 290.553<br>745.237<br>23/16                      | 290.553<br>745.237<br>23/16                      | 0.000<br>0.000<br>31/ 1                             |
| AUG | 297.375<br>709.868<br>22/16                      | 297.375<br>709.868<br>22/16                      | 0.000<br>0.000<br>31/ 1                             |
| SEP | 210.399<br>662.509<br>7/16                       | 210.399<br>662.509<br>7/16                       | 0.000<br>0.000<br>30/ 1                             |
| OCT | 174.705<br>366.183<br>1/18                       | 174.705<br>366.183<br>1/18                       | 114.876<br>1189.122<br>20/ 6                        |
| NOV | 179.679<br>322.355<br>30/24                      | 179.679<br>322.355<br>30/24                      | 361.790<br>1456.738<br>3/ 6                         |
| DEC | 195.040<br>322.696<br>13/ 8                      | 195.040<br>322.696<br>13/ 8                      | 658.156<br>1734.475<br>13/ 6                        |
|     | ONE YEAR<br>USE/PEAK                             | 2520.938<br>745.237                              | 3050.342<br>1998.945                                |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 14:56:43 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 117.94      | 3050.34     |
| SPACE COOL                                       | 422.11      | 0.00        |
| HVAC AUX   | 535.92      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 1444.91     | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 0.00        | 0.00        |
| TOTAL  | 2520.89     | 3050.34     |

TOTAL SITE ENERGY 5571.28 MBTU 210.7 KBTU/SQFT-YR GROSS-AREA 210.7 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 10620.73 MBTU 401.7 KBTU/SQFT-YR GROSS-AREA 401.7 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-B = 6. OVERHANG-W = 32.  
 OVERHANG-D = 10. ..

E-W HEIGHT = 19.8 WIDTH = 36.0 CONS = EXWALL-1  
 AZIMUTH = 122 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 19.8 WIDTH = 138.0 CONS = EXWALL-1  
 AZIMUTH = 212 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.0 WIDTH = 3.0 CONS = DOOR-MET  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-B = 6. OVERHANG-W = 32.  
 OVERHANG-D = 10. ..

U-W HEIGHT = 155.5 WIDTH = 170.0 CONS = FLOOR ..

ROOF HEIGHT = 155.5 WIDTH = 170.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #3 ECONOMIZER FOR BLDG. #6914 \*  
 LINE-5 \*MAIN FLOOR OF MAIN POST EXCHANGE \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

# \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,5) (55.)  
 (6,24) (74.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,5) (85.)  
 (6,24) (72.) ..

```

SD_WT_CL  =DAY-SCHEDULE (1,5) (57.)
              (6,24) (76.) ..
SD_SM_HT  =DAY-SCHEDULE (1,5) (83.)
              (6,24) (70.) ..
SD_OA%    =DAY-SCHEDULE (1,24) (0.57) ..
SD_FAN_CYC =DAY-SCHEDULE (1,5) (0.)
              (6,24) (1.) ..

SW_ON     =WEEK-SCHEDULE (ALL) SD_ON  ..

SW_OFF    =WEEK-SCHEDULE (ALL) SD_OFF  ..

SW_WT_HT  =WEEK-SCHEDULE (ALL) SD_WT_HT ..

SW_SM_CL  =WEEK-SCHEDULE (ALL) SD_SM_CL ..

SW_WT_CL  =WEEK-SCHEDULE (ALL) SD_WT_CL ..

SW_SM_HT  =WEEK-SCHEDULE (ALL) SD_SM_HT ..

SW_OA%    =WEEK-SCHEDULE (ALL) SD_OA%  ..

SW_FAN_CYC =WEEK-SCHEDULE (ALL) SD_FAN_CYC ..

```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON  ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF  ..
```

## \$ HEATING SEASON

```
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON  ..
```

## \$ COOLING SEASON

```
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF  ..
```

## \$ HEATING SET TEMP

```
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
              THRU OCT  1 SW_SM_HT
              THRU DEC 31 SW_WT_HT  ..
```

## \$ COOLING SET TEMP

```
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
              THRU OCT  1 SW_SM_CL
              THRU DEC 31 SW_WT_CL  ..
```

```
S_OA%     =SCHEDULE THRU DEC 31 SW_OA%  ..
```

```
S_HRLY-RPT =SCHEDULE THRU JAN 14 SW_OFF
              THRU JAN 15 SW_ON
              THRU JUL 22 SW_OFF
```


THRU JUL 23 SW\_ON  
THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

# \$ ZONE DESCRIPTION

MAIN-SALES =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

# \$ SYSTEM DESCRIPTION

LARG-SZ =SYSTEM SYSTEM-TYPE = PSZ  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE-SCHED  
COOLING-SCHEDULE = S\_CL\_SCHED ECONO-LIMIT-T = 71.0   
SUPPLY-CFM = 28100. RATED-CFM = 28100.  
MIN-OUTSIDE-AIR = 0.57 FAN-SCHEDULE = S\_FAN\_CYC  
SUPPLY-DELTA-T = 1.8 SUPPLY-KW = 0.00059  
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 1328568.  
COOL-SH-CAP = 1107140. COOL-FT-MIN = 0.  
HEATING-CAPACITY = -1800000. MIN-HP-T = 0.  
MAX-HP-SUPP-T = 0. CRANKCASE-MAX-T = 0.  
OUTSIDE-FAN-T = 45. HEAT-SOURCE = HOT-WATER  
SIZING-OPTION = COINCIDENT  
ZONE-NAMES = (MAIN-SALES) ..

# \$ HOURLY REPORT DESCRIPTION

AHU-BLK =REPORT-BLOCK VARIABLE-TYPE = LARG-SZ  
VARIABLE-LIST = (3,5,6,17,39,1) ..  
ZONE-BLK =REPORT-BLOCK VARIABLE-TYPE = MAIN-SALES  
VARIABLE-LIST = (17,18,7,6) ..  
AHU-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
REPORT-BLOCK = (AHU-BLK)  
..  
ZONE-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
REPORT-BLOCK = (ZONE-BLK)  
..  
END ..  
COMPUTE SYSTEMS ..  
  
INPUT PLANT ..

\$-----\$  
\$ E Z - D O E P L A N T S I N P U T \$

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 15:11:29 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR LARG-SZ TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -239.442                    | 15                      | -8.F                 | -9.F                 | -1134.249                               | 45730.                             | 81.700                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -169.550                    | 3                       | -1.F                 | -2.F                 | -1003.084                               | 41211.                             | 81.700                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -117.901                    | 4                       | 14.F                 | 12.F                 | -790.575                                | 45910.                             | 81.600                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -26.270                     | 5                       | 31.F                 | 28.F                 | -526.755                                | 44406.                             | 81.600                          |
| MAY   | 92.24457                    | 31 18                   | 90.F                 | 76.F                 | 861.151                                 | -4.455                      | 1                       | 38.F                 | 36.F                 | -371.268                                | 54464.                             | 172.684                         |
| JUN   | 265.85046                   | 27 16                   | 89.F                 | 77.F                 | 895.840                                 | 0.000                       |                         |                      |                      | 0.000                                   | 70177.                             | 175.220                         |
| JUL   | 358.83597                   | 23 16                   | 98.F                 | 79.F                 | 1037.712                                | 0.000                       |                         |                      |                      | 0.000                                   | 80358.                             | 200.200                         |
| AUG   | 350.76666                   | 20 14                   | 93.F                 | 78.F                 | 950.488                                 | 0.000                       |                         |                      |                      | 0.000                                   | 81321.                             | 188.964                         |
| SEP   | 170.33578                   | 7 16                    | 93.F                 | 76.F                 | 882.136                                 | 0.000                       |                         |                      |                      | 0.000                                   | 60878.                             | 178.368                         |
| OCT   | 4.24344                     | 1 17                    | 85.F                 | 68.F                 | 512.682                                 | -22.109                     | 20                      | 24.F                 | 23.F                 | -603.647                                | 45965.                             | 134.379                         |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -93.388                     | 3                       | 13.F                 | 12.F                 | -780.966                                | 44035.                             | 81.600                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -204.026                    | 13                      | 2.F                  | 1.F                  | -958.799                                | 45725.                             | 81.700                          |
| TOTAL | 1242.276                    |                         |                      |                      |   | -877.143                    |                         |                      |                      |   | 660210.                            |                                 |
| MAX   |                             |                         |                      |                      | 1037.712                                |                             |                         |                      |                      | -1134.249                               |                                    | 200.200                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 15:11:29 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR LARG-SZ TOPEKA, KS

| MONTH  | N U M B E R O F |                 |                   |          | H O U R S                  |                            |                              |                           | C O I N C I D E N T                  |  |  |  | L O A D S  |  |  |  |
|--------|-----------------|-----------------|-------------------|----------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|--|--|--|--|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |  |
| JAN    | 0               | 586             | 0                 | 158      | 744                        | 0                          | 589                          | 0                         | 3                                    | -296.778   | 81.600   |  |  | 81.600   |  |  |
| FEB    | 0               | 524             | 0                 | 148      | 672                        | 0                          | 532                          | 0                         | 8                                    | -309.860   | 81.600   |  |  | 81.600   |  |  |
| MAR    | 0               | 489             | 0                 | 255      | 744                        | 0                          | 589                          | 0                         | 100                                  | -295.299   | 81.600   |  |  | 81.600   |  |  |
| APR    | 0               | 180             | 0                 | 540      | 720                        | 0                          | 570                          | 0                         | 390                                  | 0.000  | 3.251  |  |  |  |  |  |
| MAY    | 234             | 46              | 0                 | 464      | 360                        | 376                        | 589                          | 0                         | 309                                  | 0.000  | 172.684  |  |  | 172.684  |  |  |
| JUN    | 518             | 0               | 0                 | 202      | 0                          | 713                        | 570                          | 0                         | 52                                   | 0.000  | 175.220  |  |  | 175.220  |  |  |
| JUL    | 576             | 0               | 0                 | 168      | 0                          | 744                        | 589                          | 0                         | 13                                   | 0.000  | 200.200  |  |  | 200.200  |  |  |
| AUG    | 573             | 0               | 0                 | 171      | 0                          | 743                        | 589                          | 0                         | 16                                   | 0.000  | 185.189  |  |  | 185.189  |  |  |
| SEP    | 399             | 0               | 0                 | 321      | 0                          | 664                        | 570                          | 0                         | 171                                  | 0.000  | 178.368  |  |  | 178.368  |  |  |
| OCT    | 14              | 162             | 0                 | 568      | 720                        | 19                         | 589                          | 0                         | 413                                  | 0.000  | 134.379  |  |  | 134.379  |  |  |
| NOV    | 0               | 404             | 0                 | 316      | 720                        | 0                          | 570                          | 0                         | 166                                  | -378.488   | 81.600   |  |  | 81.600   |  |  |
| DEC    | 0               | 583             | 0                 | 161      | 744                        | 0                          | 589                          | 0                         | 6                                    | -363.913   | 81.600   |  |  | 81.600   |  |  |
| ANNUAL | 2314            | 2974            | 0                 | 3472     | 5424                       | 3259                       | 6935                         | 0                         | 1647                                 |  |  |  |  |  |  |  |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 15:11:29 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>172.831<br>310.141<br>28/ 9 | NATURAL-GAS<br>352.806<br>1425.128<br>15/ 6 |
|-----|--|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 172.831<br>310.141<br>28/ 9                | 352.806<br>1425.128<br>15/ 6                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 155.241<br>310.141<br>3/ 8                 | 261.898<br>1286.228<br>3/ 6                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 168.123<br>309.800<br>31/24                | 185.687<br>1054.834<br>4/ 6                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 154.904<br>309.800<br>16/ 7                | 43.533<br>756.635<br>5/ 6                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 186.638<br>589.618<br>31/18                | 7.599<br>575.212<br>1/ 7                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 239.615<br>598.275<br>27/16                | 0.000<br>0.000<br>30/ 1                     |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 274.376<br>683.570<br>23/16                | 0.000<br>0.000<br>31/ 1                     |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 277.666<br>645.202<br>22/16                | 0.000<br>0.000<br>31/ 1                     |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 207.863<br>609.025<br>7/16                 | 0.000<br>0.000<br>30/ 1                     |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 159.863<br>458.827<br>1/17                 | 37.174<br>844.798<br>20/ 6                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 159.844<br>309.800<br>30/24                | 149.219<br>1044.186<br>3/ 6                 |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 172.007<br>310.141<br>13/ 8                | 307.894<br>1238.656<br>13/ 6                |
|     | ONE YEAR<br>USE/PEAK                             | 2328.971<br>683.570                        | 1345.809<br>1425.128                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 15:11:29 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 56.69       | 1345.81     |
| SPACE COOL                                       | 416.61      | 0.00        |
| HVAC AUX   | 410.70      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 1444.89     | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 0.00        | 0.00        |
| TOTAL  | 2328.89     | 1345.81     |

TOTAL SITE ENERGY 3674.78 MBTU 139.0 KBTU/SQFT-YR GROSS-AREA 139.0 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 8339.72 MBTU 315.4 KBTU/SQFT-YR GROSS-AREA 315.4 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 1.4  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-B = 6. OVERHANG-W = 32.  
 OVERHANG-D = 10. ..

E-W HEIGHT = 19.8 WIDTH = 36.0 CONS = EXWALL-1  
 AZIMUTH = 122 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 19.8 WIDTH = 138.0 CONS = EXWALL-1  
 AZIMUTH = 212 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.0 WIDTH = 3.0 CONS = DOOR-MET  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-B = 6. OVERHANG-W = 32.  
 OVERHANG-D = 10. ..

U-W HEIGHT = 155.5 WIDTH = 170.0 CONS = FLOOR ..

ROOF HEIGHT = 155.5 WIDTH = 170.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*


LINE-4 \*RUN #4 NIGHT INFILTRATION BLDG. #6914 \*  
 LINE-5 \*MAIN FLOOR OF MAIN POST EXCHANGE \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,24) (76.) ..  
 SD\_SM\_HT =DAY-SCHEDULE (1,24) (70.) ..

```
SD_OA%      =DAY-SCHEDULE  (1,5) (0.)
              (6,24) (0.57) ..
```



```
SW_ON       =WEEK-SCHEDULE (ALL) SD_ON  ..
```

```
SW_OFF      =WEEK-SCHEDULE (ALL) SD_OFF  ..
```

```
SW_WT_HT    =WEEK-SCHEDULE (ALL) SD_WT_HT ..
```

```
SW_SM_CL    =WEEK-SCHEDULE (ALL) SD_SM_CL ..
```

```
SW_WT_CL    =WEEK-SCHEDULE (ALL) SD_WT_CL ..
```

```
SW_SM_HT    =WEEK-SCHEDULE (ALL) SD_SM_HT ..
```

```
SW_OA%      =WEEK-SCHEDULE (ALL) SD_OA%  ..
```

# \$ FULL ON SYSTEM

```
S_ON        =SCHEDULE THRU DEC 31 SW_ON  ..
```

# \$ FULL OFF SYSTEM

```
S_OFF       =SCHEDULE THRU DEC 31 SW_OFF  ..
```

# \$ HEATING SEASON

```
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON  ..
```

# \$ COOLING SEASON

```
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF  ..
```

# \$ HEATING SET TEMP

```
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
              THRU OCT  1 SW_SM_HT
              THRU DEC 31 SW_WT_HT  ..
```

# \$ COOLING SET TEMP

```
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
              THRU OCT  1 SW_SM_CL
              THRU DEC 31 SW_WT_CL  ..
```


```
S_OA%       =SCHEDULE THRU DEC 31 SW_OA%  ..
```

```
S_HRLY-RPT =SCHEDULE THRU JAN 14 SW_OFF
              THRU JAN 15 SW_ON
              THRU JUL 22 SW_OFF
              THRU JUL 23 SW_ON
              THRU DEC 31 SW_OFF  ..
```

# \$ ZONE DESCRIPTION

MAIN-SALES =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

LARG-SZ =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED OA-CONTROL = FIXED  
 SUPPLY-CFM = 28100. RATED-CFM = 28100.  
 MIN-OUTSIDE-AIR = 0.57 MIN-AIR-SCH = S\_OA%   
 MAX-OA-FRACTION = 0.57 SUPPLY-DELTA-T = 1.8  
 SUPPLY-KW = 0.00059  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 1328568.  
 COOL-SH-CAP = 1107140. COOL-FT-MIN = 0.  
 HEATING-CAPACITY = -1800000. MIN-HP-T = 0.  
 MAX-HP-SUPP-T = 0. CRANKCASE-MAX-T = 0.  
 OUTSIDE-FAN-T = 45. HEAT-SOURCE = HOT-WATER  
 SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (MAIN-SALES) ..

## \$ HOURLY REPORT DESCRIPTION

AHU-BLK =REPORT-BLOCK VARIABLE-TYPE = LARG-SZ  
 VARIABLE-LIST = (3,5,6,17,39,1) ..  
 ZONE-BLK =REPORT-BLOCK VARIABLE-TYPE = MAIN-SALES  
 VARIABLE-LIST = (17,18,7,6) ..  
 AHU-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (AHU-BLK)  
 ..  
 ZONE-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
 REPORT-BLOCK = (ZONE-BLK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 15:43:13 SDL RUN 1 |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
|--|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
| DENVER, CO 80227 RUN #4 NIGHT INFILTRATION BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE        |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR LARG-SZ TOPEKA, KS                               |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----                                    |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN  | 0.00000                     |                         |                      |                      | 0.000                                   | -425.891                    | 15                      | -8. F                | -9. F                | -1662.039                               | 48299.                    | 81.700                          |
| FEB  | 0.00000                     |                         |                      |                      | 0.000                                   | -312.716                    | 3                       | -1. F                | -2. F                | -1475.482                               | 43532.                    | 81.700                          |
| MAR  | 0.00000                     |                         |                      |                      | 0.000                                   | -235.482                    | 4                       | 14. F                | 12. F                | -1159.350                               | 48480.                    | 81.600                          |
| APR  | 0.00000                     |                         |                      |                      | 0.000                                   | -60.082                     | 5                       | 31. F                | 28. F                | -787.696                                | 46892.                    | 81.600                          |
| MAY  | 118.13782                   | 31 18                   | 90. F                | 76. F                | 1122.082                                | -11.403                     | 1                       | 37. F                | 37. F                | -552.879                                | 59297.                    | 197.898                         |
| JUN  | 334.48047                   | 27 16                   | 89. F                | 77. F                | 1179.922                                | 0.000                       |                         |                      |                      | 0.000                                   | 79013.                    | 201.855                         |
| JUL  | 448.55234                   | 23 17                   | 97. F                | 79. F                | 1404.293                                | 0.000                       |                         |                      |                      | 0.000                                   | 91214.                    | 229.416                         |
| AUG  | 442.27390                   | 20 14                   | 93. F                | 78. F                | 1266.371                                | 0.000                       |                         |                      |                      | 0.000                                   | 92754.                    | 217.358                         |
| SEP  | 213.39183                   | 5 18                    | 90. F                | 77. F                | 1166.976                                | 0.000                       |                         |                      |                      | 0.000                                   | 67299.                    | 204.748                         |
| OCT  | 4.34122                     | 1 17                    | 85. F                | 68. F                | 544.435                                 | -53.337                     | 20                      | 24. F                | 23. F                | -917.909                                | 48542.                    | 137.128                         |
| NOV  | 0.00000                     |                         |                      |                      | 0.000                                   | -187.634                    | 3                       | 13. F                | 12. F                | -1155.383                               | 46522.                    | 81.600                          |
| DEC  | 0.00000                     |                         |                      |                      | 0.000                                   | -372.827                    | 13                      | 2. F                 | 1. F                 | -1411.192                               | 48295.                    | 81.700                          |
| TOTAL  | 1561.176                    |                         |                      |                      | -----                                   | -1659.372                   |                         |                      |                      | -----                                   | 720163.                   | 229.416                         |
| MAX  |                             |                         |                      |                      | 1404.293                                |                             |                         |                      |                      | -1662.039                               |                           |                                 |

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 15:43:13 SDL RUN 1 |                          |                          |  |                            |                            |                              |                           |                                      |  |  |
|--|--------------------------|--------------------------|--|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #4 NIGHT INFILTRATION BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE        |                          |                          |  |                            |                            |                              |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOADS FOR LARG-SZ TOPEKA, KS                                       |                          |                          |  |                            |                            |                              |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----  |                          |                          |  |                            |                            |                              |                           |                                      |  |  |
| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN  | 0                        | 744                      | 0  | 744                        | 0                          | 744                          | 0                         | 0                                    | -577.469   | 81.600   |
| FEB  | 0                        | 668                      | 0  | 672                        | 0                          | 672                          | 0                         | 4                                    | -595.144   | 81.600   |
| MAR  | 0                        | 680                      | 0  | 744                        | 0                          | 744                          | 0                         | 64                                   | -575.863   | 81.600   |
| APR  | 0                        | 434                      | 0  | 720                        | 0                          | 720                          | 0                         | 286                                  | 0.000  | 19.830   |
| MAY  | 352                      | 164                      | 0  | 360                        | 352                        | 744                          | 0                         | 228                                  | 0.000  | 197.898  |
| JUN  | 694                      | 0                        | 0  | 0                          | 696                        | 720                          | 0                         | 26                                   | 0.000  | 201.855  |
| JUL  | 737                      | 0                        | 0  | 0                          | 738                        | 744                          | 0                         | 7                                    | 0.000  | 228.499  |
| AUG  | 733                      | 0                        | 0  | 0                          | 735                        | 744                          | 0                         | 11                                   | 0.000  | 213.897  |
| SEP  | 575                      | 0                        | 0  | 0                          | 579                        | 720                          | 0                         | 145                                  | 0.000  | 201.752  |
| OCT  | 14                       | 400                      | 0  | 720                        | 14                         | 744                          | 0                         | 330                                  | 0.000  | 137.128  |
| NOV  | 0                        | 594                      | 0  | 720                        | 0                          | 720                          | 0                         | 126                                  | -707.536   | 81.600   |
| DEC  | 0                        | 736                      | 0  | 744                        | 0                          | 744                          | 0                         | 8                                    | -673.519   | 81.600   |
| ANNUAL   | 3105                     | 4420                     | 0  | 5424                       | 3114                       | 8760                         | 0                         | 1235                                 |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 15:43:13 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>193.087<br>324.651<br>28/ 9 | NATURAL-GAS<br>617.723<br>2088.270<br>15/ 6 |
|-----|--|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 173.424<br>324.651<br>3/ 8                 | 472.210<br>1890.775<br>3/ 6                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 187.475<br>324.309<br>31/24                | 366.388<br>1546.672<br>4/ 6                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 169.089<br>324.309<br>16/ 8                | 101.626<br>1126.956<br>5/ 6                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 205.016<br>675.710<br>31/18                | 20.712<br>853.315<br>1/ 6                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 269.783<br>689.220<br>27/16                | 0.000<br>0.000<br>30/ 1                     |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 311.445<br>783.325<br>23/16                | 0.000<br>0.000<br>31/ 1                     |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 316.702<br>742.152<br>22/16                | 0.000<br>0.000<br>31/ 1                     |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 229.788<br>699.097<br>7/16                 | 0.000<br>0.000<br>30/ 1                     |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 174.055<br>468.213<br>1/17                 | 91.443<br>1275.874<br>20/ 6                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 177.313<br>324.309<br>30/24                | 295.269<br>1542.278<br>3/ 6                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 192.164<br>324.651<br>13/ 8                | 552.639<br>1821.758<br>13/ 6                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |  |   |
|     | ONE YEAR<br>USE/PEAK                             | 2599.342<br>783.325                        | 2518.011<br>2088.270                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 15:43:13 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 100.97      | 2518.01     |
| SPACE COOL      | 518.02      | 0.00        |
| HVAC AUX        | 535.36      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 1444.88     | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 0.00        | 0.00        |
| TOTAL           | 2599.24     | 2518.01     |

TOTAL SITE ENERGY 5117.35 MBTU 193.5 KBTU/SQFT-YR GROSS-AREA 193.5 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 10323.84 MBTU 390.4 KBTU/SQFT-YR GROSS-AREA 390.4 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-B = 6. OVERHANG-W = 32.  
 OVERHANG-D = 10. ..

E-W HEIGHT = 19.8 WIDTH = 36.0 CONS = EXWALL-1  
 AZIMUTH = 122 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 19.8 WIDTH = 138.0 CONS = EXWALL-1  
 AZIMUTH = 212 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.0 WIDTH = 3.0 CONS = DOOR-MET  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
 OVERHANG-A = 10. OVERHANG-B = 6. OVERHANG-W = 32.  
 OVERHANG-D = 10. ..

U-W HEIGHT = 155.5 WIDTH = 170.0 CONS = FLOOR ..

ROOF HEIGHT = 155.5 WIDTH = 170.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$


#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #5 DAY INFILTRATION BLDG. #6914 \*  
 LINE-5 \*MAIN FLOOR OF MAIN POST EXCHANGE \* ..  
 ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,24) (76.) ..  
 SD\_SM\_HT =DAY-SCHEDULE (1,24) (70.) ..

```
SD_OA%      =DAY-SCHEDULE  (1,5) (0.57)
              (6,24) (0.) ..
```



```
SW_ON       =WEEK-SCHEDULE (ALL) SD_ON  ..
```

```
SW_OFF      =WEEK-SCHEDULE (ALL) SD_OFF ..
```

```
SW_WT_HT    =WEEK-SCHEDULE (ALL) SD_WT_HT ..
```

```
SW_SM_CL    =WEEK-SCHEDULE (ALL) SD_SM_CL ..
```

```
SW_WT_CL    =WEEK-SCHEDULE (ALL) SD_WT_CL ..
```

```
SW_SM_HT    =WEEK-SCHEDULE (ALL) SD_SM_HT ..
```

```
SW_OA%      =WEEK-SCHEDULE (ALL) SD_OA%  ..
```

# \$ FULL ON SYSTEM

```
S_ON        =SCHEDULE THRU DEC 31 SW_ON  ..
```

# \$ FULL OFF SYSTEM

```
S_OFF       =SCHEDULE THRU DEC 31 SW_OFF ..
```

# \$ HEATING SEASON

```
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON  ..
```

# \$ COOLING SEASON

```
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF ..
```

# \$ HEATING SET TEMP

```
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
              THRU OCT  1 SW_SM_HT
              THRU DEC 31 SW_WT_HT ..
```

# \$ COOLING SET TEMP

```
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_WT_CL
              THRU OCT  1 SW_SM_CL
              THRU DEC 31 SW_WT_CL ..
```

```
S_OA%       =SCHEDULE THRU DEC 31 SW_OA%  ..
```

```
S_HRLY-RPT =SCHEDULE THRU JAN 14 SW_OFF
              THRU JAN 15 SW_ON
              THRU JUL 22 SW_OFF
              THRU JUL 23 SW_ON
              THRU DEC 31 SW_OFF  ..
```

# \$ ZONE DESCRIPTION

```

MAIN-SALES =ZONE    DESIGN-HEAT-T = 74.0  DESIGN-COOL-T = 72.0
                    HEAT-TEMP-SCH = S_HT_SET_F  COOL-TEMP-SCH = S_CL_SET_F
                    ZONE-TYPE = CONDITIONED
                    THERMOSTAT-TYPE = PROPORTIONAL
                    SIZING-OPTION = FROM-LOADS  ..

```

## \$ SYSTEM DESCRIPTION

```

LARG-SZ    =SYSTEM    SYSTEM-TYPE = PSZ
                    MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
                    HEATING-SCHEDULE = S_HE-SCHED
                    COOLING-SCHEDULE = S_CL_SCHED  OA-CONTROL = FIXED
                    SUPPLY-CFM = 28100.  RATED-CFM = 28100.
                    MIN-OUTSIDE-AIR = 0.57  MIN-AIR-SCH = S_OA%
                    MAX-OA-FRACTION = 0.57  SUPPLY-DELTA-T = 1.8
                    SUPPLY-KW = 0.00059
                    MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
                    NIGHT-CYCLE-CTRL = STAY-OFF  NIGHT-VENT-DT = 0.0
                    MIN-CFM-RATIO = 1.0  COOLING-CAPACITY = 1328568.
                    COOL-SH-CAP = 1107140.  COOL-FT-MIN = 0.
                    HEATING-CAPACITY = -1800000.  MIN-HP-T = 0.
                    MAX-HP-SUPP-T = 0.  CRANKCASE-MAX-T = 0.
                    OUTSIDE-FAN-T = 45.  HEAT-SOURCE = HOT-WATER
                    SIZING-OPTION = COINCIDENT
                    ZONE-NAMES = (MAIN-SALES)  ..

```

## \$ HOURLY REPORT DESCRIPTION

```

AHU-BLK    =REPORT-BLOCK VARIABLE-TYPE = LARG-SZ
                    VARIABLE-LIST = (3,5,6,17,39,1)  ..
ZONE-BLK    =REPORT-BLOCK VARIABLE-TYPE = MAIN-SALES
                    VARIABLE-LIST = (17,18,7,6)  ..
AHU-HRLY    = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                    REPORT-BLOCK = (AHU-BLK)
..
ZONE-HRLY    = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                    REPORT-BLOCK = (ZONE-BLK)
..
END  ..
COMPUTE SYSTEMS  ..

INPUT PLANT  ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

```

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 15:53:40 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR LARG-SZ TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -87.542                     | 15                      | -8.F                 | -9.F                 | -1370.868                               | 48299.                             | 81.700                          |
| FEB   | 0.00000                     |                         |                      |                      | -60.402                     | 3                       | -1.F                 | -2.F                 | -1168.006                               | 43532.                             | 81.700                          |
| MAR   | 0.00000                     |                         |                      |                      | -38.419                     | 4                       | 14.F                 | 12.F                 | -822.719                                | 48480.                             | 81.600                          |
| APR   | 0.00000                     |                         |                      |                      | -6.920                      | 5                       | 31.F                 | 29.F                 | -291.202                                | 46892.                             | 81.600                          |
| MAY   | 98.38956                    | 16                      | 62.F                 | 59.F                 | -2.255                      | 4                       | 48.F                 | 46.F                 | -118.532                                | 57595.                             | 153.561                         |
| JUN   | 194.03796                   | 20                      | 77.F                 | 73.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 66665.                             | 125.568                         |
| JUL   | 227.30663                   | 13                      | 80.F                 | 74.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 71693.                             | 130.552                         |
| AUG   | 229.09183                   | 21                      | 82.F                 | 74.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 72884.                             | 132.823                         |
| SEP   | 163.05345                   | 6                       | 79.F                 | 72.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 62683.                             | 126.440                         |
| OCT   | 4.00641                     | 1                       | 67.F                 | 62.F                 | -6.084                      | 2                       | 55.F                 | 53.F                 | -392.574                                | 48512.                             | 115.118                         |
| NOV   | 0.00000                     |                         |                      |                      | -25.569                     | 3                       | 13.F                 | 12.F                 | -747.002                                | 46522.                             | 81.600                          |
| DEC   | 0.00000                     |                         |                      |                      | -68.034                     | 13                      | 5.F                  | 4.F                  | -1080.630                               | 48295.                             | 81.700                          |
| TOTAL | 915.886                     |                         |                      |                      | -295.226                    |                         |                      |                      | -1370.868                               | 662078.                            | 153.561                         |
| TAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 15:53:40 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR LARG-SZ TOPEKA, KS

| HOURS COOLING LOAD |      |       | HOURS COINCIDENT COOL-HEAT LOAD |       |         | N U M B E R O F |       |         | H O U R S |         |        | HOURS COOLING AVAIL. |        |         | HOURS HEATING AVAIL. |         |         | HOURS FANS ON CYCLE ON |         |         | HOURS NIGHT VENTING |         |      | HOURS FLOATING WHEN FANS ON |         |        | --COINCIDENT LOADS--<br>HEATING ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |         |        |
|--------------------|------|-------|---------------------------------|-------|---------|-----------------|-------|---------|-----------|---------|--------|----------------------|--------|---------|----------------------|---------|---------|------------------------|---------|---------|---------------------|---------|------|-----------------------------|---------|--------|--|---------|--------|
| MONTH              | LOAD | HOURS | LOAD                            | HOURS | COOLING | LOAD            | HOURS | COOLING | LOAD      | HEATING | AVAIL. | HEATING              | AVAIL. | COOLING | AVAIL.               | FANS ON | COOLING | AVAIL.                 | FANS ON | COOLING | AVAIL.              | VENTING | WHEN | FANS ON                     | COOLING | AVAIL. | HEATING  | PEAK    |        |
| JAN                | 0    | 165   | 0                               | 0     | 579     | 744             | 0     | 744     | 0         | 744     | 0      | 0                    | 744    | 0       | 0                    | 0       | 0       | 0                      | 0       | 0       | 0                   | 0       | 0    | 579                         | 0       | 0      | 0  | 0       | 81.600 |
| FEB                | 0    | 150   | 0                               | 0     | 522     | 672             | 0     | 672     | 0         | 672     | 0      | 0                    | 672    | 0       | 0                    | 0       | 0       | 0                      | 0       | 0       | 0                   | 0       | 522  | 0                           | 0       | 0      | 0  | 81.600  |        |
| MAR                | 0    | 163   | 0                               | 0     | 581     | 744             | 0     | 744     | 0         | 744     | 0      | 0                    | 744    | 0       | 0                    | 0       | 0       | 0                      | 0       | 0       | 0                   | 0       | 581  | 0                           | 0       | 0      | 0  | 81.600  |        |
| APR                | 0    | 158   | 0                               | 0     | 562     | 720             | 0     | 720     | 0         | 720     | 0      | 0                    | 720    | 0       | 0                    | 0       | 0       | 0                      | 0       | 0       | 0                   | 0       | 562  | -119.667                    | 0       | 0      | 0  | 19.830  |        |
| MAY                | 319  | 81    | 0                               | 0     | 344     | 360             | 0     | 360     | 0         | 360     | 0      | 0                    | 360    | 324     | 744                  | 0       | 0       | 0                      | 0       | 0       | 0                   | 0       | 344  | 0                           | 0       | 0      | 0  | 87.425  |        |
| JUN                | 664  | 0     | 0                               | 0     | 56      | 0               | 0     | 0       | 0         | 0       | 0      | 0                    | 667    | 720     | 720                  | 0       | 0       | 0                      | 0       | 0       | 0                   | 0       | 56   | 0                           | 0       | 0      | 0  | 63.469  |        |
| JUL                | 731  | 0     | 0                               | 0     | 13      | 0               | 0     | 0       | 0         | 0       | 0      | 0                    | 733    | 744     | 744                  | 0       | 0       | 0                      | 0       | 0       | 0                   | 0       | 13   | 0                           | 0       | 0      | 0  | 75.129  |        |
| AUG                | 720  | 0     | 0                               | 0     | 24      | 0               | 0     | 0       | 0         | 0       | 0      | 0                    | 721    | 744     | 744                  | 0       | 0       | 0                      | 0       | 0       | 0                   | 0       | 24   | 0                           | 0       | 0      | 0  | 79.853  |        |
| SEP                | 601  | 0     | 0                               | 0     | 119     | 0               | 0     | 0       | 0         | 0       | 0      | 0                    | 605    | 720     | 720                  | 0       | 0       | 0                      | 0       | 0       | 0                   | 0       | 119  | 0                           | 0       | 0      | 0  | 66.063  |        |
| OCT                | 17   | 164   | 0                               | 0     | 563     | 720             | 0     | 720     | 0         | 720     | 0      | 0                    | 18     | 744     | 744                  | 0       | 0       | 0                      | 0       | 0       | 0                   | 0       | 563  | 0                           | 0       | 0      | 0  | 109.824 |        |
| NOV                | 0    | 162   | 0                               | 0     | 558     | 720             | 0     | 720     | 0         | 720     | 0      | 0                    | 0      | 720     | 720                  | 0       | 0       | 0                      | 0       | 0       | 0                   | 0       | 558  | 0                           | 0       | 0      | 0  | 81.600  |        |
| DEC                | 0    | 165   | 0                               | 0     | 579     | 744             | 0     | 744     | 0         | 744     | 0      | 0                    | 0      | 744     | 744                  | 0       | 0       | 0                      | 0       | 0       | 0                   | 0       | 579  | 0                           | 0       | 0      | 0  | 81.600  |        |
| ANNUAL             | 3052 | 1208  | 0                               | 0     | 4500    | 5424            | 0     | 5424    | 0         | 5424    | 0      | 0                    | 3068   | 8760    | 8760                 | 0       | 0       | 0                      | 0       | 0       | 0                   | 0       | 4500 | 0                           | 0       | 0      | 0  | 0       | 0      |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 15:53:40 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO                   | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|----------------------|--|---|---|
| JAN                  | 170.317<br>278.960<br>28/9                       | 125.243<br>1722.428<br>15/5                         | 91.369<br>1506.957<br>3/5                           |
| FEB                  | 169.350<br>278.619<br>31/24                      | 60.163<br>1126.582<br>4/5                           | 13.135<br>487.425<br>5/5                            |
| MAR                  | 161.983<br>278.619<br>30/24                      | 4.622<br>205.259<br>4/1                             | 0.000<br>0.000<br>0.000                             |
| APR                  | 197.500<br>524.321<br>16/11                      | 0.000<br>0.000<br>0.000                             | 31/1<br>0.000<br>0.000                              |
| MAY                  | 227.622<br>428.741<br>28/17                      | 0.000<br>0.000<br>0.000                             | 31/1<br>0.000<br>0.000                              |
| JUN                  | 244.790<br>445.760<br>23/16                      | 248.858<br>453.513<br>11/16                         | 31/1<br>0.000<br>0.000                              |
| JUL                  | 214.029<br>431.721<br>7/16                       | 167.477<br>393.061<br>1/18                          | 11.791<br>628.713<br>2/5                            |
| AUG                  | 162.018<br>278.619<br>30/24                      | 41.733<br>1040.875<br>3/5                           | 101.112<br>1412.324<br>13/5                         |
| SEP                  | 169.957<br>278.960<br>13/8                       | 2287.335<br>524.321                                 | 449.168<br>1722.428                                 |
| OCT                  |  |   |   |
| NOV                  |  |   |   |
| DEC                  |  |   |   |
| ONE YEAR<br>USE/PEAK |  |   |   |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 15:53:40 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION BLDG. #6914 MAIN FLOOR OF MAIN POST EXCHANGE  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 17.90       | 449.17      |
| SPACE COOL                                       | 319.69      | 0.00        |
| HVAC AUX   | 504.77      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 1444.89     | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 0.00        | 0.00        |
| TOTAL  | 2287.24     | 449.17      |

TOTAL SITE ENERGY 2736.50 MBTU 103.5 KBTU/SQFT-YR GROSS-AREA 103.5 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 7318.04 MBTU 276.8 KBTU/SQFT-YR GROSS-AREA 276.8 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.2  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

**COMPUTER ENERGY SIMULATIONS**

**BLDG. 724  
SIMULATOR BUILDINGS**



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

BUILDING NO.: 724  
BLDG. TYPE: FLIGHT SIMULATOR

### ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3    | RUN4    | RUN5    |
|----------------|---------|---------|---------|---------|---------|---------|
| HEATING (MBtu) | 157.4   | 86.4    | 125.2   | 172.2   | 37.2    | 106.1   |
| COOLING (kWH)  | 671,529 | 646,666 | 667,510 | 637,378 | 669,229 | 671,017 |

|                |                                     |
|----------------|-------------------------------------|
| SUPPLY AIR FAN | 12,688 CFM                          |
| FLOOR AREA     | 10,506 FT <sup>2</sup>              |
| CFMI           | 1269 CFM                            |
| UA             | 790 BTU/HR-°F                       |
| BLDG CONSTR.   | 1 (1 FOR LIGHT )<br>2 (2 FOR HEAVY) |

| EZDOE COMPUTER RUN DEFINITION: |                             |
|--------------------------------|-----------------------------|
| BASERUN                        | EXISTING OPERATION          |
| RUN1                           | NIGHT SETBACK               |
| RUN2                           | DDC CONTROL                 |
| RUN3                           | ECONOMIZER                  |
| RUN4                           | NIGHTTIME INFILTRATION (OA) |
| RUN5                           | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      |            | ANNUAL HEATING & COOLING HOURS |            |
|--------------------|-------------------|------|------------|--------------------------------|------------|
| M-F                | 600               | 1600 | 50 HR      | HR. ON HEATING                 | 1621 HR/YR |
| SAT.               | 0                 | 0    | 0 HR       | HR. ON COOLING                 | 986 HR/YR  |
| SUN.               | 0                 | 0    | 0 HR       | HR. OFF HEATING                | 3827 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 50 HR/WK   | HR. OFF COOLING                | 2326 HR/YR |
|                    | TOTAL UNOCC. HR.  |      | 118 HR/WK  |                                |            |
|                    | ANNUAL OCCUPY HR. |      | 2607 HR/YR |                                |            |
|                    | ANNUAL UNOCC. HR. |      | 6153 HR/YR |                                |            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5448 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3312 HR/YR  
HRS SAVED (HTG ONLY) 5448 - 1621 = 3827 HR/YR  
HRS SAVED (CLG ONLY) 3312 - 986 = 2326 HR/YR

|           |   |   |               |   |                     |
|-----------|---|---|---------------|---|---------------------|
| HOAUHC    | 157.43 MBtu   | - | 37.24 MBtu    | = | 1.54E+01 Btu/CFM-HR |
|           | 1268.8 CFM  | x | 6153 HR/YR    |   |                     |
| HOAUH     | 157.43 MBtu   | - | 37.24 MBtu    | = | 2.48E+01 Btu/CFM-HR |
|           | 1268.8 CFM  | x | 3827 HR/YR    |   |                     |
| COAUHC    | 671,529.4 kWH   | - | 669,229.4 kWH | = | 2.95E-04 kWH/CFM-HR |
|           | 1268.8 CFM  | x | 6153 HR/YR    |   |                     |
| COAUH     | 671,529.4 kWH   | - | 669,229.4 kWH | = | 7.79E-04 kWH/CFM-HR |
|           | 1268.8 CFM  | x | 2326 HR/YR    |   |                     |
| HOAOHC    | 157.43 MBtu   | - | 106.06 MBtu   | = | 1.55E+01 Btu/CFM-HR |
|           | 1268.8 CFM  | x | 2607 HR/YR    |   |                     |
| HOAOH     | 157.43 MBtu   | - | 106.06 MBtu   | = | 2.50E+01 Btu/CFM-HR |
|           | 1268.8 CFM  | x | 1621 HR/YR    |   |                     |
| COAOHC    | 671,529.4 kWH   | - | 671,016.7 kWH | = | 1.55E-04 kWH/CFM-HR |
|           | 1268.8 CFM  | x | 2607 HR/YR    |   |                     |
| COAOH     | 671,529.4 kWH   | - | 671,016.7 kWH | = | 4.10E-04 kWH/CFM-HR |
|           | 1268.8 CFM  | x | 986 HR/YR     |   |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | = | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | = | 0.17                |
| ECC       | 646,665.7 kWH   | - | 637,377.7 kWH | = | 7.43E-04 kWH/CFM-HR |
|           | 12688 CFM   | x | 986 HR/YR     |   |                     |
| ECHC      | 646,665.7 kWH   | - | 637,377.7 kWH | = | 2.81E-04 kWH/CFM-HR |
|           | 12688 CFM   | x | 2607 HR/YR    |   |                     |
| NSUCHC    | 671,529.4 kWH   | - | 646,665.7 kWH | = | 3.18E-04 kWH/CFM-HR |
|           | 12688 CFM   | x | 6153 HR/YR    |   |                     |
| NSUCC     | 671,529.4 kWH   | - | 646,665.7 kWH | = | 8.42E-04 kWH/CFM-HR |
|           | 12688 CFM   | x | 2326 HR/YR    |   |                     |
| DDCCHC    | 671,529.4 kWH   | - | 667,509.5 kWH | = | 1.22E-04 kWH/CFM-HR |
|           | 12688 CFM   | x | 2607 HR/YR    |   |                     |
| DDCCC     | 671,529.4 kWH   | - | 667,509.5 kWH | = | 3.21E-04 kWH/CFM-HR |
|           | 12688 CFM   | x | 986 HR/YR     |   |                     |
| NSC       | 157.43 MBtu   | - | 86.37 MBtu    | = | 8.99E+04 Btu/UA     |
|           | 790.1094 UA   |   |               |   |                     |
| DDCH      | 157.43 MBtu   | - | 125.22 MBtu   | = | 4.08E+04 Btu/UA     |
|           | 790.1094 UA   |   |               |   |                     |
| OPT       | (2 HR/DAY X 240 DAY/YR)                               | - | 132 HR/YR     | = | 348 HR/YR           |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               | = | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01          | = | 5.67 HR/YR          |





INPUT LOADS ..

```

$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION BLDG. #724      *
        LINE-5 *FLIGHT SIMULATOR      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
LOADS-REPORT VERIFICATION=(LV-D)
            SUMMARY=(LS-C,LS-D)
            HOURLY-DATA-SAVE = YES ..

BUILDING-LOCATION LATITUDE = 39.0
                LONGITUDE = 96.5
                ALTITUDE = 1065.
                TIME-ZONE = 6
                GROSS-AREA = 13100
                SHIELDING-COEF = 0.29
                X-REF = 0.0
                Y-REF = 0.0 ..

RUN-PERIOD  JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

```

LD_ON      =DAY-SCHEDULE (1,24) (1.) ..

LD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

LD_PEO/LIT =DAY-SCHEDULE (1,4) (0.)
                        (5) (0.5)
                        (6,15) (1.)
                        (16) (0.75)
                        (17,24) (0.) ..

LW_ON      =WEEK-SCHEDULE (ALL) LD_ON ..

LW_PEO/LIT =WEEK-SCHEDULE (MON) LD_OFF
                        (TUE) LD_OFF
                        (WED) LD_PEO/LIT
                        (THU) LD_PEO/LIT
                        (FRI) LD_PEO/LIT
                        (SAT) LD_PEO/LIT
                        (SUN) LD_PEO/LIT
                        (HOL) LD_OFF ..

```

LW\_OFF =WEEK-SCHEDULE (ALL) LD\_OFF ..

\$ PEOPLE AND LIGHTING SCH

L\_PEO/LIT =SCHEDULE THRU DEC 31 LW\_PEO/LIT ..

\$ FULL ON 100%

L\_ON =SCHEDULE THRU DEC 31 LW\_ON ..

\$ FULL OFF 0%

L\_OFF =SCHEDULE THRU DEC 31 LW\_OFF ..

# \$ CONSTRUCTION TYPES

\$ BRICK, AIR, INSL, CMU

WALL-1 =LAYERS MATERIAL=(BK05,AL11,IN37,CB31) I-F-R= 0.6100  
THICKNESS=(0.333,0.000,0.333,0.667) ..

EXWALL-1 =CONSTRUCTION LAYERS = WALL-1  
ABSORPTANCE = 0.880  
ROUGHNESS = 2 ..

FLOOR =CONSTRUCTION U-VALUE = 0.020  
ABSORPTANCE = 0.610  
ROUGHNESS = 5 ..

\$ METAL ROOF, W/ INSL

MTL-ROOF =LAYERS MATERIAL=(HF-A3,IN05,HF-A3,AL33)  
THICKNESS=(0.005,0.807,0.005,0.000) ..

ROOF-1 =CONSTRUCTION LAYERS = MTL-ROOF  
ABSORPTANCE = 0.800  
ROUGHNESS = 5 ..

\$ STANDARD METAL DOOR

DOOR-STD =LAYERS MATERIAL=(HF-A3,IN22,HF-A3) I-F-R= 0.6100  
THICKNESS=(0.005,0.083,0.005) ..

DOOR-MET =CONSTRUCTION LAYERS = DOOR-STD  
ABSORPTANCE = 0.860  
ROUGHNESS = 5 ..

\$ WALL THAT LOOKS LIKE A ROOF

WALL/ROF =LAYERS MATERIAL=(HF-A3,IN37,CB36)  
THICKNESS=(0.005,0.333,1.000) ..

ROOF/WAL =CONSTRUCTION LAYERS = WALL/ROF  
ABSORPTANCE = 0.800  
ROUGHNESS = 5 ..

2\_PN\_STD =GLASS-TYPE GLASS-TYPE-CODE = 2  
PANES = 2 ..

## \$ SPACE DESCRIPTION

ZONE\_2      =SPACE      AREA = 4498.0    VOLUME = 53975.0  
                  TEMPERATURE = (73.)    ZONE-TYPE = CONDITIONED  
                  PEOPLE-SCHEDULE = L\_PEOP/LIT    AREA/PERSON = 496.0  
                  PEOPLE-HG-LAT = 625.0    PEOPLE-HG-SENS = 375.0  
                  LIGHTING-TYPE = SUS-FLUOR    LIGHTING-W/SQFT = 1.73  
                  LIGHT-TO-SPACE = 1.0    LIGHTING-SCHEDULE = L\_PEOP/LIT  
                  EQUIP-SCHEDULE = L\_PEOP/LIT    EQUIPMENT-W/SQFT = 0.12  
                  EQUIPMENT-KW = 19.25    SOURCE-SENSIBLE = 0.0  
                  FURN-WEIGHT = 1.    INF-METHOD = AIR-CHANGE  
                  AIR-CHANGES/HR = 0.11    INF-SCHEDULE = L\_ON    ..

E-W            HEIGHT = 12.0    WIDTH = 106.4    CONS = EXWALL-1  
                  AZIMUTH = 135    SKY-FORM-FACTOR = 0.5  
                  GND-FORM-FACTOR = 0.5    ..

E-W            HEIGHT = 12.0    WIDTH = 44.8    CONS = EXWALL-1  
                  AZIMUTH = 225    SKY-FORM-FACTOR = 0.5  
                  GND-FORM-FACTOR = 0.5    ..

E-W            HEIGHT = 21.0    WIDTH = 12.8    CONS = EXWALL-1  
                  AZIMUTH = 225    SKY-FORM-FACTOR = 0.5  
                  GND-FORM-FACTOR = 0.5    ..

E-W            HEIGHT = 2.5    WIDTH = 28.8    CONS = ROOF/WAL  
                  AZIMUTH = 135    SKY-FORM-FACTOR = 0.5  
                  GND-FORM-FACTOR = 0.5    ..

E-W            HEIGHT = 12.0    WIDTH = 35.2    CONS = EXWALL-1  
                  AZIMUTH = 45    SKY-FORM-FACTOR = 0.5  
                  GND-FORM-FACTOR = 0.5    ..

U-W            HEIGHT = 67.0    WIDTH = 67.0    CONS = FLOOR ..

ROOF           HEIGHT = 67.0    WIDTH = 67.0    CONS = ROOF-1  
                  TILT = 0    SKY-FORM-FACTOR = 1.0    ..

ZONE\_1      =SPACE      AREA = 2780.0    VOLUME = 37233.0  
                  TEMPERATURE = (73.)    ZONE-TYPE = CONDITIONED  
                  PEOPLE-SCHEDULE = L\_PEOP/LIT    AREA/PERSON = 496.0  
                  PEOPLE-HG-LAT = 625.0    PEOPLE-HG-SENS = 375.0  
                  LIGHTING-TYPE = SUS-FLUOR    LIGHTING-W/SQFT = 1.73  
                  LIGHT-TO-SPACE = 1.0    LIGHTING-SCHEDULE = L\_PEOP/LIT  
                  EQUIP-SCHEDULE = L\_PEOP/LIT    EQUIPMENT-W/SQFT = 0.12  
                  SOURCE-SENSIBLE = 0.0    FURN-WEIGHT = 1.  
                  INF-METHOD = AIR-CHANGE    AIR-CHANGES/HR = 0.11  
                  INF-SCHEDULE = L\_ON    ..

E-W            HEIGHT = 12.0    WIDTH = 57.6    CONS = EXWALL-1  
                  AZIMUTH = 315    SKY-FORM-FACTOR = 0.5  
                  GND-FORM-FACTOR = 0.5    ..

E-W            HEIGHT = 12.0    WIDTH = 44.8    CONS = EXWALL-1

AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 21.0 WIDTH = 12.8 CONS = EXWALL-1  
AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 2.5 WIDTH = 28.8 CONS = ROOF/WAL  
AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 53.0 WIDTH = 52.5 CONS = ROOF-1  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

U-W HEIGHT = 53.0 WIDTH = 52.5 CONS = FLOOR ..

COMP\_AREA =SPACE AREA = 1362.0 VOLUME = 16344.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOP/LIT AREA/PERSON = 496.0  
PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.47  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_PEOP/LIT  
EQUIP-SCHEDULE = L\_ON EQUIPMENT-KW = 33.2  
SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 1.  
INF-METHOD = NONE ..

E-W HEIGHT = 12.0 WIDTH = 44.8 CONS = EXWALL-1  
AZIMUTH = 45 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 40.0 WIDTH = 34.0 CONS = FLOOR ..

ROOF HEIGHT = 40.0 WIDTH = 34.0 CONS = ROOF-1  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

SIMUL\_AREA =SPACE AREA = 1866.0 VOLUME = 43851.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOP/LIT AREA/PERSON = 496.0  
PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 0.83  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_PEOP/LIT  
SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 1.  
INF-METHOD = NONE ..

U-W HEIGHT = 41.0 WIDTH = 45.5 CONS = FLOOR ..

ROOF HEIGHT = 11.2 WIDTH = 36.8 CONS = ROOF-1  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

E-W HEIGHT = 11.2 WIDTH = 24.0 CONS = ROOF/WAL  
AZIMUTH = 45 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 11.2 WIDTH = 24.0 CONS = ROOF/WAL

AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 2.5 WIDTH = 43.2 CONS = ROOF/WAL  
AZIMUTH = 135 SKY-FORM-FACTOR = 1.0 ..

E-W HEIGHT = 2.5 WIDTH = 43.2 CONS = ROOF/WAL  
AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 14.4 WIDTH = 36.8 CONS = ROOF-1  
AZIMUTH = 135 TILT = 40 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 18.0 WIDTH = 46.0 CONS = ROOF-1  
AZIMUTH = 315 TILT = 40 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
\$ E Z - D O E S Y S T E M S I N P U T \$  
\$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*BASELINE SIMULATION BLDG. #724 \*

LINE-5 \*FLIGHT SIMULATOR \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
SYSTEMS-REPORT VERIFICATION=(SV-A)  
SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
SD\_WT\_HT\_W =DAY-SCHEDULE (1,24) (74.) ..  
SD\_SM\_CL\_W =DAY-SCHEDULE (1,24) (72.) ..  
SD\_WT\_CL\_W =DAY-SCHEDULE (1,24) (76.) ..  
SD\_SM\_HT\_W =DAY-SCHEDULE (1,24) (70.) ..  
SD\_WT\_HT\_D =DAY-SCHEDULE (1,24) (55.) ..  
SD\_SM\_CL\_D =DAY-SCHEDULE (1,24) (85.) ..  
SD\_WT\_CL\_D =DAY-SCHEDULE (1,24) (57.) ..  
SD\_SM\_HT\_D =DAY-SCHEDULE (1,24) (83.) ..  
SD\_FAN\_WK =DAY-SCHEDULE (1,4) (0.)  
(5,16) (1.)

```

(17,24) (0.) ..
SD_FAN_END =DAY-SCHEDULE (1,24) (0.) ..
SD_WTHT_CR =DAY-SCHEDULE (1,24) (74.) ..
SD_SMCL_CR =DAY-SCHEDULE (1,24) (72.) ..
SD_WTCL_CR =DAY-SCHEDULE (1,24) (76.) ..
SD_SMHT_CR =DAY-SCHEDULE (1,24) (70.) ..
SD_OA%      =DAY-SCHEDULE (1,24) (0.1) ..

SW_ON       =WEEK-SCHEDULE (ALL) SD_ON ..

SW_OFF      =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT    =WEEK-SCHEDULE (ALL) SD_WT_HT_W ..

SW_SM_CL    =WEEK-SCHEDULE (ALL) SD_SM_CL_W ..

SW_WT_CL    =WEEK-SCHEDULE (ALL) SD_WT_CL_W ..

SW_SM_HT    =WEEK-SCHEDULE (ALL) SD_SM_HT_W ..

SW_FAN_CYC  =WEEK-SCHEDULE (MON) SD_FAN_END
              (TUE) SD_FAN_END
              (WED) SD_FAN_WK
              (THU) SD_FAN_WK
              (FRI) SD_FAN_WK
              (SAT) SD_FAN_WK
              (SUN) SD_FAN_WK
              (HOL) SD_FAN_END ..

SW_WTHT_CR  =WEEK-SCHEDULE (ALL) SD_WTHT_CR ..

SW_SMCL_CR  =WEEK-SCHEDULE (ALL) SD_SMCL_CR ..

SW_WTCL_CR  =WEEK-SCHEDULE (ALL) SD_WTCL_CR ..

SW_SMHT_CR  =WEEK-SCHEDULE (ALL) SD_SMHT_CR ..

SW_OA%      =WEEK-SCHEDULE (ALL) SD_OA% ..

$ FULL ON SYSTEM
S_ON        =SCHEDULE THRU DEC 31 SW_ON ..

$ FULL OFF SYSTEM
S_OFF       =SCHEDULE THRU DEC 31 SW_OFF ..

$ HEATING SEASON
S_HE-SCHED  =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT 1 SW_OFF
              THRU DEC 31 SW_ON ..

$ COOLING SEASON
S_CL_SCHED  =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT 1 SW_ON
              THRU DEC 31 SW_OFF ..

```

## \$ HEATING SET TEMP

S\_HT\_SET =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET =SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

S\_HRLY-RPT =SCHEDULE THRU JAN 3 SW\_OFF  
 THRU JAN 5 SW\_ON  
 THRU AUG 13 SW\_OFF  
 THRU AUG 15 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

## \$ HEATING SET TEMP

S\_HT\_SETCR =SCHEDULE THRU MAY 15 SW\_WTHT\_CR  
 THRU OCT 1 SW\_SMHT\_CR  
 THRU DEC 31 SW\_WTHT\_CR ..

## \$ COOLING SET TEMP

S\_CL\_SETCR =SCHEDULE THRU MAY 15 SW\_WTCL\_CR  
 THRU OCT 1 SW\_SMCL\_CR  
 THRU DEC 31 SW\_WTCL\_CR ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

## \$ ZONE DESCRIPTION

ZONE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

ZONE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

COMP\_AREA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SETCR COOL-TEMP-SCH = S\_CL\_SETCR  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

SIMUL\_AREA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL



SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ-PERIM =SYSTEM SYSTEM-TYPE = MZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 OA-CONTROL = FIXED SUPPLY-CFM = 6200.  
 RATED-CFM = 6200. MIN-OUTSIDE-AIR = 0.1  
 MIN-AIR-SCH = S\_OA% MAX-OA-FRACTION = 0.1  
 FAN-SCHEDULE = S\_ON SUPPLY-DELTA-T = 2.7  
 SUPPLY-KW = 0.00088 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  
 NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 1.0  
 COOLING-CAPACITY = 190200. COOL-SH-CAP = 152160.  
 HEATING-CAPACITY = -146100.  
 SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (ZONE\_1, ZONE\_2) ..

SING-ZN =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_ON COOLING-SCHEDULE = S\_ON  
 HEAT-SET-T = 120.0 OA-CONTROL = FIXED  
 SUPPLY-CFM = 6000. RATED-CFM = 6000.  
 MIN-OUTSIDE-AIR = 0.1 MIN-AIR-SCH = S\_OA%  
 MAX-OA-FRACTION = 0.1 FAN-SCHEDULE = S\_ON  
 SUPPLY-DELTA-T = 1.8 SUPPLY-KW = 0.00059  
 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY NIGHT-VENT-DT = 0.0  
 COOLING-CAPACITY = 165100. COOL-SH-CAP = 132080.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -120100.  
 MIN-HP-T = 0. MAX-HP-SUPP-T = 0. DEFROST-T = 0.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER SIZING-OPTION = COINCIDENT  
 RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (SIMUL\_AREA) ..

CRU'S =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_ON COOLING-SCHEDULE = S\_ON  
 SUPPLY-CFM = 17200. RATED-CFM = 17200.  
 FAN-SCHEDULE = S\_OFF SUPPLY-DELTA-T = 1.8  
 SUPPLY-KW = 0.00059 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  
 NIGHT-VENT-DT = 0.0 COOLING-CAPACITY = 322000.  
 COOL-SH-CAP = 322000. COOL-FT-MIN = 0.  
 HEATING-CAPACITY = -95600. MIN-HP-T = 0.  
 MAX-HP-SUPP-T = 0. DEFROST-T = 0.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = ELECTRIC SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (COMP\_AREA) ..

## \$ HOURLY REPORT DESCRIPTION

SPACE-MZ =REPORT-BLOCK VARIABLE-TYPE = ZONE\_2  
 VARIABLE-LIST = (17,18,7,6) ..

```

SPACE-SZ  =REPORT-BLOCK VARIABLE-TYPE = SIMUL_AREA
           VARIABLE-LIST = (17,18,7,6) ..
SPACE-CRU  =REPORT-BLOCK VARIABLE-TYPE = COMP_AREA
           VARIABLE-LIST = (17,18,7,6) ..
AHU-MZ     =REPORT-BLOCK VARIABLE-TYPE = MZ-PERIM
           VARIABLE-LIST = (3,5,6,18,19,17) ..
AHU-SZ     =REPORT-BLOCK VARIABLE-TYPE = SING-ZN
           VARIABLE-LIST = (3,5,6,17) ..
AHU-CRU    =REPORT-BLOCK VARIABLE-TYPE = CRU'S
           VARIABLE-LIST = (3,5,6,17) ..
ZONE-HRLY  = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
           REPORT-BLOCK = (SPACE-MZ,SPACE-SZ,SPACE-CRU)

..
AHU-HRLY   = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
           REPORT-BLOCK = (AHU-MZ,AHU-SZ,AHU-CRU)

..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION BLDG. #724      *
        LINE-5 *FLIGHT SIMULATOR      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC WARNINGS ..
PLANT-REPORT VERIFICATION=(PV-A)
            SUMMARY=(PS-B,BEPS)
            HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON      =DAY-SCHEDULE (1,24) (1.) ..
PD_OFF     =DAY-SCHEDULE (1,24) (0.) ..

PW_OFF     =WEEK-SCHEDULE (ALL) PD_OFF ..
PW_ON      =WEEK-SCHEDULE (ALL) PD_ON ..

```

## \$ HEATING SEASON

```

P_HEAT     =SCHEDULE THRU MAY 15 PW_ON
            THRU OCT 1 PW_OFF

```

THRU DEC 31 PW\_ON ..

\$ COOLING\_SEASON

P\_COOL =SCHEDULE THRU MAY 15 PW\_OFF

THRU OCT 1 PW\_ON

THRU DEC 31 PW\_OFF ..

\$ EQUIPMENT DESCRIPTION

BOILER-HW =PLANT-EQUIPMENT TYPE = HW-BOILER

SIZE = -999. ..

CHILLER-RC =PLANT-EQUIPMENT TYPE = HERM-REC-CHLR

SIZE = -999. INSTALLED-NUMBER = 4

MAX-NUMBER-AVAIL = 4 ..

PLANT-PARAMETERS BOILER-FUEL = NATURAL-GAS TWR-PUMP-HEAD = 35.

HERM-REC-COND-TYPE = AIR CHILL-WTR-T = 45.

CCIRC-HEAD = 30.0 HCIRC-HEAD = 63.0

HCIRC-DESIGN-T-DROP = 20.0 ..

ENERGY-RESOURCE RESOURCE = ELECTRICITY ..

ENERGY-RESOURCE RESOURCE = NATURAL-GAS ..

HEAT-SCH =LOAD-ASSIGNMENT TYPE = HEATING

OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000

PLANT-EQUIPMENT = BOILER-HW

NUMBER = 1 ..

COOL-SCH =LOAD-ASSIGNMENT TYPE = COOLING

OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000

PLANT-EQUIPMENT = CHILLER-RC

NUMBER = 4 ..

END ..

COMPUTE PLANT ..

STOP ..

EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:38:58 LDL RUN 1  
DENVER, CO 80227 BASELINE SIMULATION BLDG. #724 FLIGHT SIMULATOR  
REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

[illegible]

EMC ENGINEERS INC. EZZOE - ELITE SOFTWARE DEVELOPMENT INC  
DENVER, CO 80227 BASELINE SIMULATION BLDG. #724  
PROJECT- IV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT  
DOE-2.1D FLIGHT SIMULATOR  
TOPEKA, KS  
5/15/1995 9:38:58 LDL RUN 1

[illegible]

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:38:58 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION BLDG. #724 FLIGHT SIMULATOR  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

|             | AVERAGE<br>U-VALUE/GLASS<br>(BTU/HR-SQFT-F) | AVERAGE<br>U-VALUE/WALLS<br>(BTU/HR-SQFT-F) | AVERAGE U-VALUE<br>WALLS+GLASS<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | OPAQUE<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) |
|-------------|---|---|---|-------------------------|--------------------------|--------------------------------|
| NORTH-EAST  | 0.000                                       | 0.049                                       | 0.049   | 0.00                    | 1228.80                  | 1228.80                        |
| SOUTH-EAST  | 0.000                                       | 0.049                                       | 0.049   | 0.00                    | 1456.80                  | 1456.80                        |
| SOUTH-WEST  | 0.000                                       | 0.049                                       | 0.049   | 0.00                    | 1881.60                  | 1881.60                        |
| NORTH-WEST  | 0.000                                       | 0.049                                       | 0.049   | 0.00                    | 871.20                   | 871.20                         |
| ROOF        | 0.000                                       | 0.029                                       | 0.029   | 0.00                    | 10401.58                 | 10401.58                       |
| ALL WALLS   | 0.000                                       | 0.049                                       | 0.049   | 0.00                    | 5438.40                  | 5438.40                        |
| WALLS+ROOFS | 0.000                                       | 0.036                                       | 0.036   | 0.00                    | 15839.98                 | 15839.98                       |
| UNDERGRND   | 0.000                                       | 0.020                                       | 0.020   | 0.00                    | 10497.00                 | 10497.00                       |
| BUILDING    | 0.000                                       | 0.030                                       | 0.030   | 0.00                    | 26336.98                 | 26336.98                       |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:38:58 LDL RUN 1  
DENVER, CO 80227 BASELINE SIMULATION BLDG. #724 FLIGHT SIMULATOR TOPEKA, KS  
REPORT- LS-C BUILDING PEAK LOAD COMPONENTS

\*\*\* BUILDING \*\*\*

FLOOR AREA 10506 SQFT 976 SQMT  
VOLUME 151403 CUFT 4288 CUMT

TIME DRY-BULB TEMP WET-BULB TEMP  
AUG 11 3PM 99F 37C  
72F 22C

HEATING LOAD  
JAN 4 3AM 8F -13C  
7F -14C

|                      | SENSIBLE<br>(KBTU/H) | ( KW ) | LATENT<br>(KBTU/H) | ( KW ) | SENSIBLE<br>(KBTU/H) | ( KW ) |
|----------------------|----------------------|--------|--------------------|--------|----------------------|--------|
| WALLS                | 3.097                | 0.907  | 0.000              | 0.000  | -12.623              | -3.697 |
| ROOFS                | 21.140               | 6.191  | 0.000              | 0.000  | -17.072              | -5.000 |
| GLASS CONDUCTION     | 0.000                | 0.000  | 0.000              | 0.000  | 0.000                | 0.000  |
| GLASS SOLAR          | 0.000                | 0.000  | 0.000              | 0.000  | 0.000                | 0.000  |
| DOOR                 | 0.000                | 0.000  | 0.000              | 0.000  | 0.000                | 0.000  |
| INTERNAL SURFACES    | 0.000                | 0.000  | 0.000              | 0.000  | 0.000                | 0.000  |
| UNDERGROUND SURFACES | -0.993               | -0.291 | 0.000              | 0.000  | -5.247               | -1.537 |
| OCCUPANTS TO SPACE   | 7.357                | 2.155  | 13.238             | 3.877  | 0.015                | 0.005  |
| LIGHT TO SPACE       | 49.105               | 14.382 | 0.000              | 0.000  | 0.158                | 0.046  |
| EQUIPMENT TO SPACE   | 176.927              | 51.817 | 0.000              | 0.000  | 0.153                | 0.045  |
| PROCESS TO SPACE     | 0.000                | 0.000  | 0.000              | 0.000  | 0.000                | 0.000  |
| INFILTRATION         | 3.578                | 1.048  | 1.133              | 0.332  | -26.001              | -7.615 |

TOTAL 260.211 76.209 14.372 4.209  
TOTAL LOAD 274.583 KBTU/H 80.419 KW  
TOTAL LOAD / AREA 26.14BTU/H.SQFT 82.393 W /SQMT

-60.617 KBTU/H  
-17.753 KW  
5.770BTU/H.SQFT 18.189 W /SQMT

\*\*\*\*\*  
\* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR  
\* LOADS  
\* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION  
\* IN CONSIDERATION  
\*\*\*\*\*

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:38:58 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION BLDG. #724 FLIGHT SIMULATOR  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-PERIM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -10.486                     | 5                       | 4                    | 0.F                  | -73.482                                 | 12153.                             | 38.157                          |
| FEB   | 0.00000                     |                         |                      |                      | -6.510                      | 2                       | 4                    | 10.F                 | -68.129                                 | 11024.                             | 38.157                          |
| MAR   | 0.00000                     |                         |                      |                      | -3.734                      | 2                       | 4                    | 25.F                 | -47.732                                 | 12153.                             | 38.157                          |
| APR   | 0.00000                     |                         |                      |                      | -0.748                      | 6                       | 4                    | 35.F                 | -13.487                                 | 12022.                             | 38.157                          |
| MAY   | 26.57586                    | 16                      | 2                    | 59.F                 | -0.355                      | 4                       | 17                   | 53.F                 | -10.519                                 | 11785.                             | 38.157                          |
| JUN   | 56.74051                    | 19                      | 15                   | 76.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 12022.                             | 38.157                          |
| JUL   | 68.07877                    | 16                      | 15                   | 80.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 12521.                             | 38.157                          |
| AUG   | 63.90371                    | 20                      | 14                   | 78.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 11785.                             | 38.157                          |
| SEP   | 47.47175                    | 7                       | 15                   | 76.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 12022.                             | 38.157                          |
| OCT   | 1.56012                     | 1                       | 15                   | 67.F                 | -0.830                      | 2                       | 2                    | 59.F                 | -47.779                                 | 12153.                             | 38.157                          |
| NOV   | 0.00000                     |                         |                      |                      | -1.012                      | 30                      | 4                    | 28.F                 | -30.236                                 | 10918.                             | 38.157                          |
| DEC   | 0.00000                     |                         |                      |                      | -7.863                      | 13                      | 6                    | 1.F                  | -67.203                                 | 12521.                             | 38.157                          |
| TOTAL | 264.331                     |                         |                      |                      | -31.539                     |                         |                      |                      | -73.482                                 | 143067.                            | 38.157                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:38:58 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION BLDG. #724 FLIGHT SIMULATOR  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-PERIM TOPEKA, KS

| MONTH  | HOURS           |                 |                   |          | HOURS             |                   |         |         | HOURS             |                   |         |         | COINCIDENT LOADS--                                 |   |   |  |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|---------|---------|-------------------|-------------------|---------|---------|--|---|---|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | FANS ON | COOLING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0               | 744             | 0                 | 0        | 744               | 0                 | 744     | 0       | 0                 | 0                 | 0       | 0       | -33.270  | 5.456   | 5.456   | 5.456  |
| FEB    | 0               | 672             | 0                 | 0        | 672               | 0                 | 672     | 0       | 0                 | 0                 | 0       | 0       | -14.947  | 5.456   | 5.456   | 5.456  |
| MAR    | 0               | 744             | 0                 | 0        | 744               | 0                 | 744     | 0       | 0                 | 0                 | 0       | 0       | -1.379   | 5.456   | 5.456   | 5.456  |
| APR    | 0               | 720             | 0                 | 0        | 720               | 0                 | 720     | 0       | 0                 | 0                 | 0       | 0       | -1.964   | 5.456   | 5.456   | 5.456  |
| MAY    | 384             | 351             | 0                 | 9        | 360               | 384               | 744     | 0       | 0                 | 0                 | 9       | 0       | 0.000  | 5.456   | 5.456   | 5.456  |
| JUN    | 720             | 0               | 0                 | 0        | 0                 | 720               | 744     | 0       | 0                 | 0                 | 0       | 0       | 0.000  | 38.157  | 38.157  | 38.157   |
| JUL    | 744             | 0               | 0                 | 0        | 0                 | 744               | 744     | 0       | 0                 | 0                 | 0       | 0       | 0.000  | 38.157  | 38.157  | 38.157   |
| AUG    | 744             | 0               | 0                 | 0        | 0                 | 744               | 744     | 0       | 0                 | 0                 | 0       | 0       | 0.000  | 38.157  | 38.157  | 38.157   |
| SEP    | 713             | 0               | 0                 | 7        | 0                 | 720               | 744     | 0       | 0                 | 0                 | 7       | 0       | 0.000  | 38.157  | 38.157  | 38.157   |
| OCT    | 24              | 720             | 0                 | 0        | 24                | 720               | 744     | 0       | 0                 | 0                 | 0       | 0       | 0.000  | 5.456   | 5.456   | 5.456  |
| NOV    | 0               | 720             | 0                 | 0        | 720               | 0                 | 744     | 0       | 0                 | 0                 | 0       | 0       | -4.873   | 5.456   | 5.456   | 5.456  |
| DEC    | 0               | 744             | 0                 | 0        | 744               | 0                 | 744     | 0       | 0                 | 0                 | 0       | 0       | -3.901   | 5.456   | 5.456   | 5.456  |
| ANNUAL | 3329            | 5415            | 0                 | 16       | 5424              | 3336              | 8760    | 0       | 0                 | 0                 | 16      | 0       |  |   |   |  |





EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:38:58 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION BLDG. #724 FLIGHT SIMULATOR TOPEKA, KS  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR CRU'S

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 100.38735                   | 15                      | 11                   | -2. F                | 246.669                                 | 0.000                       |                         |                      |                      | 0.000                                   | 35818.                             | 59.700                          |
| FEB   | 90.95567                    | 3                       | 10                   | 8. F                 | 241.575                                 | 0.000                       |                         |                      |                      | 0.000                                   | 32679.                             | 61.377                          |
| MAR   | 101.75665                   | 3                       | 7                    | 12. F                | 235.055                                 | 0.000                       |                         |                      |                      | 0.000                                   | 36961.                             | 64.123                          |
| APR   | 99.73093                    | 28                      | 15                   | 67. F                | 240.717                                 | 0.000                       |                         |                      |                      | 0.000                                   | 37284.                             | 66.665                          |
| MAY   | 104.52082                   | 16                      | 3                    | 59. F                | 240.751                                 | 0.000                       |                         |                      |                      | 0.000                                   | 39554.                             | 68.457                          |
| JUN   | 102.29000                   | 16                      | 11                   | 63. F                | 223.435                                 | 0.000                       |                         |                      |                      | 0.000                                   | 39226.                             | 66.515                          |
| JUL   | 106.57320                   | 30                      | 6                    | 60. F                | 218.749                                 | 0.000                       |                         |                      |                      | 0.000                                   | 41040.                             | 67.627                          |
| AUG   | 106.44633                   | 4                       | 15                   | 69. F                | 232.520                                 | 0.000                       |                         |                      |                      | 0.000                                   | 41181.                             | 71.045                          |
| SEP   | 101.72897                   | 15                      | 6                    | 45. F                | 225.422                                 | 0.000                       |                         |                      |                      | 0.000                                   | 38578.                             | 68.542                          |
| OCT   | 103.31563                   | 14                      | 13                   | 64. F                | 239.604                                 | 0.000                       |                         |                      |                      | 0.000                                   | 38648.                             | 67.038                          |
| NOV   | 98.70152                    | 3                       | 7                    | 17. F                | 236.852                                 | 0.000                       |                         |                      |                      | 0.000                                   | 36072.                             | 64.627                          |
| DEC   | 101.00494                   | 14                      | 7                    | 8. F                 | 240.516                                 | 0.000                       |                         |                      |                      | 0.000                                   | 36148.                             | 61.436                          |
| TOTAL | 1217.413                    |                         |                      |                      | 246.669                                 | 0.000                       |                         |                      |                      | 0.000                                   | 453192.                            | 71.045                          |
| TAX   |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:38:58 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION BLDG. #724 FLIGHT SIMULATOR TOPEKA, KS  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR CRU'S

| MONTH  | N U M B E R O F H O U R S |                          |                            |                   |                            |                            |                              |                           |                                      |  |  |  | --COINCIDENT LOADS-- |  |
|--------|---------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|--|----------------------|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |                      |  |
| JAN    | 530                       | 0                        | 0                          | 214               | 744                        | 744                        | 530                          | 530                       | 0                                    | 0.000  | 54.234   |  |                      |  |
| FEB    | 483                       | 0                        | 0                          | 189               | 672                        | 672                        | 483                          | 483                       | 0                                    | 0.000  | 54.921   |  |                      |  |
| MAR    | 546                       | 0                        | 0                          | 198               | 744                        | 744                        | 546                          | 546                       | 0                                    | 0.000  | 55.087   |  |                      |  |
| APR    | 538                       | 0                        | 0                          | 182               | 720                        | 720                        | 538                          | 538                       | 0                                    | 0.000  | 66.665   |  |                      |  |
| MAY    | 564                       | 0                        | 0                          | 180               | 744                        | 744                        | 564                          | 564                       | 0                                    | 0.000  | 62.090   |  |                      |  |
| JUN    | 564                       | 0                        | 0                          | 156               | 720                        | 720                        | 564                          | 564                       | 0                                    | 0.000  | 63.713   |  |                      |  |
| JUL    | 595                       | 0                        | 0                          | 149               | 744                        | 744                        | 595                          | 595                       | 0                                    | 0.000  | 62.725   |  |                      |  |
| AUG    | 590                       | 0                        | 0                          | 154               | 744                        | 744                        | 590                          | 590                       | 0                                    | 0.000  | 70.934   |  |                      |  |
| SEP    | 555                       | 0                        | 0                          | 165               | 720                        | 720                        | 555                          | 555                       | 0                                    | 0.000  | 59.750   |  |                      |  |
| OCT    | 554                       | 0                        | 0                          | 190               | 744                        | 744                        | 554                          | 554                       | 0                                    | 0.000  | 66.094   |  |                      |  |
| NOV    | 529                       | 0                        | 0                          | 191               | 720                        | 720                        | 529                          | 529                       | 0                                    | 0.000  | 55.769   |  |                      |  |
| DEC    | 537                       | 0                        | 0                          | 207               | 744                        | 744                        | 537                          | 537                       | 0                                    | 0.000  | 54.877   |  |                      |  |
| ANNUAL | 6585                      | 0                        | 0                          | 2175              | 8760                       | 8760                       | 6585                         | 6585                      | 0                                    |  |  |  |                      |  |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:38:58 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION BLDG. #724 FLIGHT SIMULATOR  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|-----|--|---|---|
| JAN | 176.209<br>352.446<br>9/14                       | 41.590<br>148.941<br>5/4                            |   |
| FEB | 160.306<br>358.995<br>26/13                      | 30.052<br>134.871<br>2/4                            |   |
| MAR | 179.652<br>366.507<br>27/15                      | 21.894<br>104.288<br>15/7                           |   |
| APR | 180.173<br>384.267<br>28/15                      | 6.327<br>52.834<br>6/3                              |   |
| MAY | 197.891<br>437.114<br>21/15                      | 1.707<br>26.324<br>1/4                              |   |
| JUN | 210.611<br>450.773<br>29/15                      | 0.017<br>5.591<br>2/4                               |   |
| JUL | 224.768<br>463.212<br>23/13                      | 0.000<br>0.000<br>31/1                              |   |
| AUG | 222.157<br>467.104<br>12/15                      | 0.000<br>0.000<br>31/1                              |   |
| SEP | 203.571<br>458.539<br>7/15                       | 0.549<br>15.680<br>12/7                             |   |
| OCT | 186.401<br>426.032<br>1/14                       | 5.634<br>78.847<br>2/2                              |   |
| NOV | 171.832<br>375.562<br>23/13                      | 14.856<br>78.912<br>12/4                            |   |
| DEC | 178.473<br>359.070<br>28/15                      | 34.800<br>140.795<br>13/6                           |   |
|     | ONE YEAR<br>USE/PEAK                             | 2292.044<br>467.104                                 | 157.426<br>148.941                                  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:38:58 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION BLDG. #724 FLIGHT SIMULATOR  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 6.89        | 157.43      |
| SPACE COOL      | 425.66      | 0.00        |
| HVAC AUX        | 506.20      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 160.53      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 1192.66     | 0.00        |
| TOTAL           | 2291.93     | 157.43      |

TOTAL SITE ENERGY 2449.47 MBTU 187.0 KBTU/SQFT-YR GROSS-AREA 233.1 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 7040.44 MBTU 537.4 KBTU/SQFT-YR GROSS-AREA 670.1 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 46.7  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 2.5 WIDTH = 43.2 CONS = ROOF/WAL  
AZIMUTH = 135 SKY-FORM-FACTOR = 1.0 ..

E-W HEIGHT = 2.5 WIDTH = 43.2 CONS = ROOF/WAL  
AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 14.4 WIDTH = 36.8 CONS = ROOF-1  
AZIMUTH = 135 TILT = 40 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 18.0 WIDTH = 46.0 CONS = ROOF-1  
AZIMUTH = 315 TILT = 40 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
\$ E Z - D O E S Y S T E M S I N P U T \$  
\$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #1 NIGHT SETBACK BLDG. #724 \*

LINE-5 \*FLIGHT SIMULATOR \* ..

ABORT ERRORS ..

DIAGNOSTIC WARNINGS ..

SYSTEMS-REPORT VERIFICATION=(SV-A)

SUMMARY=(SS-A,SS-C,SS-K,SS-O)

HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..

SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

SD\_WT\_HT\_W =DAY-SCHEDULE (1,4) (55.)  
(5,16) (74.)  
(17,24) (55.) ..

SD\_SM\_CL\_W =DAY-SCHEDULE (1,4) (85.)  
(5,16) (72.)  
(17,24) (85.) ..

SD\_WT\_CL\_W =DAY-SCHEDULE (1,4) (57.)  
(5,16) (76.)  
(17,24) (57.) ..

SD\_SM\_HT\_W =DAY-SCHEDULE (1,4) (83.)

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(5,16) (70.)
(17,24) (83.) ..
SD_WT_HT_D =DAY-SCHEDULE (1,24) (55.) ..
SD_SM_CL_D =DAY-SCHEDULE (1,24) (85.) ..
SD_WT_CL_D =DAY-SCHEDULE (1,24) (57.) ..
SD_SM_HT_D =DAY-SCHEDULE (1,24) (83.) ..
SD_FAN_WK =DAY-SCHEDULE (1,4) (0.)
(5,16) (1.)
(17,24) (0.) ..
SD_FAN_END =DAY-SCHEDULE (1,24) (0.) ..
SD_WTHT_CR =DAY-SCHEDULE (1,24) (74.) ..
SD_SMCL_CR =DAY-SCHEDULE (1,24) (72.) ..
SD_WTCL_CR =DAY-SCHEDULE (1,24) (76.) ..
SD_SMHT_CR =DAY-SCHEDULE (1,24) (70.) ..

SW_ON =WEEK-SCHEDULE (ALL) SD_ON ..

SW_OFF =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT =WEEK-SCHEDULE (MON) SD_WT_HT_D
(TUE) SD_WT_HT_D
(WED) SD_WT_HT_W
(THU) SD_WT_HT_W
(FRI) SD_WT_HT_W
(SAT) SD_WT_HT_W
(SUN) SD_WT_HT_W
(HOL) SD_WT_HT_D ..

SW_SM_CL =WEEK-SCHEDULE (MON) SD_SM_CL_D
(TUE) SD_SM_CL_D
(WED) SD_SM_CL_W
(THU) SD_SM_CL_W
(FRI) SD_SM_CL_W
(SAT) SD_SM_CL_W
(SUN) SD_SM_CL_W
(HOL) SD_SM_CL_D ..

SW_WT_CL =WEEK-SCHEDULE (MON) SD_WT_CL_D
(TUE) SD_WT_CL_D
(WED) SD_WT_CL_W
(THU) SD_WT_CL_W
(FRI) SD_WT_CL_W
(SAT) SD_WT_CL_W
(SUN) SD_WT_CL_W
(HOL) SD_WT_CL_D ..

SW_SM_HT =WEEK-SCHEDULE (MON) SD_SM_HT_D
(TUE) SD_SM_HT_D
(WED) SD_SM_HT_W
(THU) SD_SM_HT_W
(FRI) SD_SM_HT_W
(SAT) SD_SM_HT_W
(SUN) SD_SM_HT_W
(HOL) SD_SM_HT_D ..

SW_FAN_CYC =WEEK-SCHEDULE (MON) SD_FAN_END

```

(TUE) SD\_FAN\_END  
 (WED) SD\_FAN\_WK  
 (THU) SD\_FAN\_WK  
 (FRI) SD\_FAN\_WK  
 (SAT) SD\_FAN\_WK  
 (SUN) SD\_FAN\_WK  
 (HOL) SD\_FAN\_END ..

SW\_WTHT\_CR =WEEK-SCHEDULE (ALL) SD\_WTHT\_CR ..

SW\_SMCL\_CR =WEEK-SCHEDULE (ALL) SD\_SMCL\_CR ..

SW\_WTCL\_CR =WEEK-SCHEDULE (ALL) SD\_WTCL\_CR ..

SW\_SMHT\_CR =WEEK-SCHEDULE (ALL) SD\_SMHT\_CR ..

# \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

# \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

# \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

# \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

# \$ HEATING SET TEMP

S\_HT\_SET =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

# \$ COOLING SET TEMP

S\_CL\_SET =SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

S\_HRLY-RPT =SCHEDULE THRU JAN 3 SW\_OFF  
 THRU JAN 5 SW\_ON  
 THRU AUG 13 SW\_OFF  
 THRU AUG 15 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

# \$ HEATING SET TEMP

S\_HT\_SETCR =SCHEDULE THRU MAY 15 SW\_WTHT\_CR  
 THRU OCT 1 SW\_SMHT\_CR  
 THRU DEC 31 SW\_WTHT\_CR ..

## \$ COOLING SET TEMP

S\_CL\_SETCR =SCHEDULE THRU MAY 15 SW\_WTCL\_CR  
 THRU OCT 1 SW\_SMCL\_CR  
 THRU DEC 31 SW\_WTCL\_CR ..

## \$ ZONE DESCRIPTION

ZONE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

ZONE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

COMP\_AREA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SETCR COOL-TEMP-SCH = S\_CL\_SETCR  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

SIMUL\_AREA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ-PERIM =SYSTEM SYSTEM-TYPE = MZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 HEAT-CONTROL = COLDEST COOL-CONTROL = WARMEST  
 OA-CONTROL = FIXED SUPPLY-CFM = 6200.  
 RATED-CFM = 6200. MIN-OUTSIDE-AIR = 0.1  
 MAX-OA-FRACTION = 0.1 FAN-SCHEDULE = S\_FAN\_CYC  
 SUPPLY-DELTA-T = 2.7 SUPPLY-KW = 0.00088  
 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 190200.  
 COOL-SH-CAP = 152160. HEATING-CAPACITY = -146100.  
 SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (ZONE\_1, ZONE\_2) ..

SING-ZN =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_ON COOLING-SCHEDULE = S\_ON  
 HEAT-SET-T = 120.0 OA-CONTROL = FIXED  
 SUPPLY-CFM = 6000. RATED-CFM = 6000.

```

MIN-OUTSIDE-AIR = 0.1  MAX-OA-FRACTION = 0.1
FAN-SCHEDULE = S_FAN_CYC  SUPPLY-DELTA-T = 1.8
SUPPLY-KW = 0.00059  NIGHT-CYCLE-CTRL = CYCLE-ON-ANY
NIGHT-VENT-DT = 0.0  COOLING-CAPACITY = 165100.
COOL-SH-CAP = 132080.  COOL-FT-MIN = 0.
HEATING-CAPACITY = -120100.  MIN-HP-T = 0.
MAX-HP-SUPP-T = 0.  DEFROST-T = 0.
CRANKCASE-MAX-T = 0.  OUTSIDE-FAN-T = 45.
HEAT-SOURCE = HOT-WATER  SIZING-OPTION = COINCIDENT
RETURN-AIR-PATH = DUCT
ZONE-NAMES = (SIMUL_AREA)  ..

```

```

CRU'S      =SYSTEM  SYSTEM-TYPE = PSZ
MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
HEATING-SCHEDULE = S_ON  COOLING-SCHEDULE = S_ON
SUPPLY-CFM = 17200.  RATED-CFM = 17200.
FAN-SCHEDULE = S_OFF  SUPPLY-DELTA-T = 1.8
SUPPLY-KW = 0.00059  NIGHT-CYCLE-CTRL = CYCLE-ON-ANY
NIGHT-VENT-DT = 0.0  COOLING-CAPACITY = 322000.
COOL-SH-CAP = 322000.  COOL-FT-MIN = 0.
HEATING-CAPACITY = -95600.  MIN-HP-T = 0.
MAX-HP-SUPP-T = 0.  DEFROST-T = 0.
CRANKCASE-MAX-T = 0.  OUTSIDE-FAN-T = 45.
HEAT-SOURCE = ELECTRIC  SIZING-OPTION = COINCIDENT
ZONE-NAMES = (COMP_AREA)  ..

```

## \$ HOURLY REPORT DESCRIPTION

```

SPACE-MZ  =REPORT-BLOCK VARIABLE-TYPE = ZONE_2
          VARIABLE-LIST = (17,18,7,6) ..
SPACE-SZ  =REPORT-BLOCK VARIABLE-TYPE = SIMUL_AREA
          VARIABLE-LIST = (17,18,7,6) ..
SPACE-CRU =REPORT-BLOCK VARIABLE-TYPE = COMP_AREA
          VARIABLE-LIST = (17,18,7,6) ..
AHU-MZ    =REPORT-BLOCK VARIABLE-TYPE = MZ-PERIM
          VARIABLE-LIST = (3,5,6,18,19,17) ..
AHU-SZ    =REPORT-BLOCK VARIABLE-TYPE = SING-ZN
          VARIABLE-LIST = (3,5,6,17) ..
AHU-CRU   =REPORT-BLOCK VARIABLE-TYPE = CRU'S
          VARIABLE-LIST = (3,5,6,17) ..
ZONE-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (SPACE-MZ,SPACE-SZ,SPACE-CRU)
..
AHU-HRLY  = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (AHU-MZ,AHU-SZ,AHU-CRU)
..
END ..
COMPUTE SYSTEMS ..

```

INPUT PLANT ..

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$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

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EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:45:18 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. #724 FLIGHT SIMULATOR  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-PERIM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                            |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -6.760                      | 5                       | 4. F                 | 3. F                 | -131.405                                | 12054.                             | 38.157                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -4.192                      | 2                       | 6. F                 | 5. F                 | -123.479                                | 10997.                             | 38.157                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -2.327                      | 16                      | 5                    | 21. F                | -99.609                                 | 12153.                             | 38.157                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.710                      | 6                       | 5                    | 36. F                | -16.568                                 | 12022.                             | 38.157                          |
| MAY   | 19.49583                    | 16                      | 2                    | 62. F                | 59. F                                   | -0.350                      | 4                       | 17                   | 55. F                | -10.357                                 | 11610.                             | 38.157                          |
| JUN   | 41.99467                    | 30                      | 14                   | 88. F                | 76. F                                   | 0.000                       |                         |                      |                      | 0.000                                   | 11754.                             | 38.157                          |
| JUL   | 49.14065                    | 13                      | 13                   | 90. F                | 79. F                                   | 0.000                       |                         |                      |                      | 0.000                                   | 12062.                             | 38.157                          |
| AUG   | 44.24644                    | 24                      | 15                   | 95. F                | 77. F                                   | 0.000                       |                         |                      |                      | 0.000                                   | 11016.                             | 38.157                          |
| SEP   | 37.10414                    | 7                       | 15                   | 92. F                | 76. F                                   | 0.000                       |                         |                      |                      | 0.000                                   | 11918.                             | 38.157                          |
| OCT   | 1.26359                     | 1                       | 15                   | 82. F                | 67. F                                   | -0.688                      | 28                      | 17                   | 61. F                | -10.412                                 | 12153.                             | 38.157                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.918                      | 30                      | 5                    | 29. F                | -44.486                                 | 10918.                             | 38.157                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -4.868                      | 14                      | 7                    | 10. F                | -137.817                                | 12401.                             | 38.157                          |
| TOTAL | 193.245                     |                         |                      |                      |   | -20.812                     |                         |                      |                      |   | 141049.                            |                                 |
| MAX   |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    | 38.157                          |
|       |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:45:18 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. #724 FLIGHT SIMULATOR  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-PERIM TOPEKA, KS

| MONTH | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | 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HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  |
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| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:45:18 SDL RUN 1 |                       |                   |               |               |                       |                   |               |               |                     |                        |
|---|-----------------------|-------------------|---------------|---------------|-----------------------|-------------------|---------------|---------------|---------------------|------------------------|
| DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. #724 FLIGHT SIMULATOR TOPEKA, KS                  |                       |                   |               |               |                       |                   |               |               |                     |                        |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR SING-ZN   |                       |                   |               |               |                       |                   |               |               |                     |                        |
| MONTH   | COOLING               |                   |               |               | HEATING               |                   |               |               | ELEC                |                        |
|   | COOLING ENERGY (MBTU) | TIME OF MAX DY HR | DRY-BULB TEMP | WET-BULB TEMP | HEATING ENERGY (MBTU) | TIME OF MAX DY HR | DRY-BULB TEMP | WET-BULB TEMP | TRICAL ENERGY (KWH) | MAXIMUM ELEC LOAD (KW) |
| JAN   | 6.53292               | 9 17              | 46.F          | 37.F          | -3.660                | 5 5               | 1.F           | 0.F           | 2328.               | 7.631                  |
| FEB   | 5.98487               | 13 17             | 54.F          | 46.F          | -3.161                | 2 5               | 8.F           | 6.F           | 2096.               | 8.142                  |
| MAR   | 6.92058               | 27 17             | 69.F          | 50.F          | -3.139                | 16 5              | 21.F          | 19.F          | 2372.               | 9.241                  |
| APR   | 8.49306               | 30 17             | 67.F          | 56.F          | -2.390                | 6 5               | 36.F          | 31.F          | 2726.               | 9.766                  |
| MAY   | 8.76491               | 15 17             | 79.F          | 69.F          | -2.237                | 16 2              | 62.F          | 59.F          | 2855.               | 10.672                 |
| JUN   | 9.36635               | 29 5              | 71.F          | 70.F          | -1.828                | 10 17             | 62.F          | 60.F          | 2871.               | 9.740                  |
| JUL   | 10.18854              | 13 5              | 78.F          | 74.F          | -1.705                | 31 17             | 79.F          | 66.F          | 3077.               | 10.145                 |
| AUG   | 9.33982               | 24 5              | 79.F          | 72.F          | -1.537                | 25 17             | 68.F          | 66.F          | 2841.               | 10.171                 |
| SEP   | 8.91153               | 7 5               | 75.F          | 71.F          | -1.993                | 30 17             | 50.F          | 46.F          | 2808.               | 9.899                  |
| OCT   | 9.74011               | 2 2               | 64.F          | 59.F          | -2.141                | 19 5              | 46.F          | 45.F          | 2937.               | 10.305                 |
| NOV   | 7.04817               | 17 17             | 60.F          | 51.F          | -2.746                | 2 5               | 16.F          | 15.F          | 2301.               | 9.100                  |
| DEC   | 6.81716               | 3 17              | 52.F          | 44.F          | -3.452                | 14 5              | 11.F          | 10.F          | 2400.               | 8.104                  |
| TOTAL   | 98.108                |                   |               |               | -29.989               |                   |               |               | 31612.              | 10.672                 |
| MAX   |                       |                   |               |               |                       |                   |               |               |                     |                        |

H18-27

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:45:18 SDL RUN 1 |                    |                    |                      |                      |                  |                     |                             |  |                |
|---|--------------------|--------------------|----------------------|----------------------|------------------|---------------------|-----------------------------|--|----------------|
| DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. #724 FLIGHT SIMULATOR TOPEKA, KS                  |                    |                    |                      |                      |                  |                     |                             |  |                |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR SING-ZN  |                    |                    |                      |                      |                  |                     |                             |  |                |
| MONTH   | NUMBER OF HOURS    |                    |                      |                      | COINCIDENT LOADS |                     |                             |  | ELEC LOAD (KW) |
|   | HOURS COOLING LOAD | HOURS HEATING LOAD | HOURS HEATING AVAIL. | HOURS COOLING AVAIL. | HOURS FANS ON    | HOURS NIGHT VENTING | HOURS FLOATING WHEN FANS ON | HEATING LOAD AT COOLING PEAK (KBTU/HR) |                |
| JAN   | 213                | 234                | 297                  | 744                  | 447              | 183                 | 0                           | 0.000                                  | 7.631          |
| FEB   | 197                | 198                | 277                  | 672                  | 395              | 155                 | 0                           | 0.000                                  | 8.142          |
| MAR   | 230                | 203                | 311                  | 744                  | 433              | 169                 | 0                           | 0.000                                  | 9.241          |
| APR   | 296                | 173                | 251                  | 720                  | 469              | 205                 | 0                           | 0.000                                  | 9.236          |
| MAY   | 315                | 165                | 264                  | 744                  | 480              | 228                 | 0                           | 0.000                                  | 10.345         |
| JUN   | 298                | 144                | 278                  | 720                  | 442              | 178                 | 0                           | 0.000                                  | 9.061          |
| JUL   | 303                | 151                | 290                  | 744                  | 454              | 178                 | 0                           | 0.000                                  | 9.472          |
| AUG   | 279                | 140                | 325                  | 744                  | 419              | 167                 | 0                           | 0.000                                  | 9.570          |
| SEP   | 304                | 149                | 267                  | 720                  | 453              | 189                 | 0                           | 0.000                                  | 9.302          |
| OCT   | 339                | 157                | 248                  | 744                  | 496              | 232                 | 0                           | 0.000                                  | 10.224         |
| NOV   | 246                | 174                | 300                  | 720                  | 420              | 192                 | 0                           | 0.000                                  | 8.638          |
| DEC   | 226                | 227                | 291                  | 744                  | 453              | 177                 | 0                           | 0.000                                  | 8.018          |
| ANNUAL  | 3246               | 2115               | 3399                 | 8760                 | 5361             | 2253                | 0                           |  |                |

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:45:18 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|---|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. #724 FLIGHT SIMULATOR TOPEKA, KS                  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR CRU'S   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----                                   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| MONTH   | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 100.38735                   | 15                      | 11                   | -2. F                | 0.000                       |                         |                      |                      | 0.000                                   | 35818.                             | 59.700                          |
| FEB   | 90.95567                    | 3                       | 10                   | 10. F                | 0.000                       |                         |                      |                      | 0.000                                   | 32679.                             | 61.377                          |
| MAR   | 101.75665                   | 3                       | 7                    | 14. F                | 0.000                       |                         |                      |                      | 0.000                                   | 36961.                             | 64.123                          |
| APR   | 99.73093                    | 28                      | 15                   | 74. F                | 0.000                       |                         |                      |                      | 0.000                                   | 37284.                             | 66.665                          |
| MAY   | 104.52082                   | 16                      | 3                    | 61. F                | 0.000                       |                         |                      |                      | 0.000                                   | 39554.                             | 68.457                          |
| JUN   | 102.29000                   | 16                      | 11                   | 66. F                | 0.000                       |                         |                      |                      | 0.000                                   | 39226.                             | 66.515                          |
| JUL   | 106.57320                   | 30                      | 6                    | 63. F                | 0.000                       |                         |                      |                      | 0.000                                   | 41040.                             | 67.627                          |
| AUG   | 106.44633                   | 4                       | 15                   | 92. F                | 0.000                       |                         |                      |                      | 0.000                                   | 41181.                             | 71.045                          |
| SEP   | 101.72897                   | 15                      | 6                    | 46. F                | 0.000                       |                         |                      |                      | 0.000                                   | 38578.                             | 68.542                          |
| OCT   | 103.31563                   | 14                      | 13                   | 71. F                | 0.000                       |                         |                      |                      | 0.000                                   | 38648.                             | 67.038                          |
| NOV   | 98.70152                    | 3                       | 7                    | 19. F                | 0.000                       |                         |                      |                      | 0.000                                   | 36072.                             | 64.627                          |
| DEC   | 101.00494                   | 14                      | 7                    | 10. F                | 0.000                       |                         |                      |                      | 0.000                                   | 36148.                             | 61.436                          |
| TOTAL   | 1217.413                    |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 453192.                            | 71.045                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      | 0.000                                   |                                    |                                 |

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:45:18 SDL RUN 1 |                          |                          |  |                   |                            |                            |                              |                     |                           |                                      |  |  |
|---|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. #724 FLIGHT SIMULATOR TOPEKA, KS                  |                          |                          |  |                   |                            |                            |                              |                     |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR CRU'S  |                          |                          |  |                   |                            |                            |                              |                     |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----   |                          |                          |  |                   |                            |                            |                              |                     |                           |                                      |  |  |
| MONTH   | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>FANS<br>ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | --COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN   | 530                      | 0                        | 0  | 214               | 744                        | 744                        | 530                          | 530                 | 0                         | 0                                    | 0.000  | 54.234   |
| FEB   | 483                      | 0                        | 0  | 189               | 672                        | 672                        | 483                          | 483                 | 0                         | 0                                    | 0.000  | 54.921   |
| MAR   | 546                      | 0                        | 0  | 198               | 744                        | 744                        | 546                          | 546                 | 0                         | 0                                    | 0.000  | 55.087   |
| APR   | 538                      | 0                        | 0  | 182               | 720                        | 720                        | 538                          | 538                 | 0                         | 0                                    | 0.000  | 66.665   |
| MAY   | 564                      | 0                        | 0  | 180               | 744                        | 744                        | 564                          | 564                 | 0                         | 0                                    | 0.000  | 62.090   |
| JUN   | 564                      | 0                        | 0  | 156               | 720                        | 720                        | 564                          | 564                 | 0                         | 0                                    | 0.000  | 63.713   |
| JUL   | 590                      | 0                        | 0  | 149               | 744                        | 744                        | 590                          | 590                 | 0                         | 0                                    | 0.000  | 62.725   |
| AUG   | 590                      | 0                        | 0  | 154               | 744                        | 744                        | 590                          | 590                 | 0                         | 0                                    | 0.000  | 70.934   |
| SEP   | 555                      | 0                        | 0  | 165               | 720                        | 720                        | 555                          | 555                 | 0                         | 0                                    | 0.000  | 59.750   |
| OCT   | 554                      | 0                        | 0  | 190               | 744                        | 744                        | 554                          | 554                 | 0                         | 0                                    | 0.000  | 66.094   |
| NOV   | 529                      | 0                        | 0  | 191               | 720                        | 720                        | 529                          | 529                 | 0                         | 0                                    | 0.000  | 55.769   |
| DEC   | 537                      | 0                        | 0  | 207               | 744                        | 744                        | 537                          | 537                 | 0                         | 0                                    | 0.000  | 54.877   |
| ANNUAL  | 6585                     | 0                        | 0  | 2175              | 8760                       | 8760                       | 6585                         | 6585                | 0                         | 0                                    | 0.000  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:45:18 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. #724 FLIGHT SIMULATOR  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>172.799<br>353.880<br>12/12 | NATURAL-GAS<br>16.331<br>224.978<br>5/ 6 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 172.799<br>353.880<br>12/12                | 16.331<br>224.978<br>5/ 6                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 157.451<br>357.718<br>26/13                | 11.867<br>218.364<br>2/ 6                |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 176.938<br>364.269<br>27/15                | 9.413<br>198.903<br>16/ 5                |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 178.624<br>378.168<br>28/15                | 5.915<br>98.987<br>6/ 5                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 190.782<br>443.986<br>21/15                | 4.767<br>71.865<br>16/ 2                 |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 196.984<br>451.562<br>29/15                | 3.188<br>40.192<br>10/17                 |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 207.943<br>469.365<br>23/13                | 2.998<br>35.420<br>31/17                 |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 202.809<br>469.409<br>21/15                | 2.708<br>37.057<br>25/17                 |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 193.437<br>465.583<br>7/15                 | 3.465<br>43.398<br>30/17                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 184.807<br>432.838<br>1/14                 | 5.457<br>71.290<br>19/ 5                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 169.334<br>369.628<br>23/13                | 6.821<br>132.031<br>30/ 5                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 175.264<br>358.732<br>28/15                | 13.444<br>226.998<br>14/ 7               |
|     | ONE YEAR<br>USE/PEAK                             | 2207.171<br>469.409                        | 86.375<br>226.998                        |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 9:45:18 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK BLDG. #724 FLIGHT SIMULATOR  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 4.09        | 86.37       |
| SPACE COOL      | 392.08      | 0.00        |
| HVAC AUX        | 457.71      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 160.53      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 1192.66     | 0.00        |
| TOTAL           | 2207.07     | 86.37       |

TOTAL SITE ENERGY 2293.55 MBTU 175.1 KBTU/SQFT-YR GROSS-AREA 218.3 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 6714.52 MBTU 512.6 KBTU/SQFT-YR GROSS-AREA 639.1 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 55.6  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 2.5 WIDTH = 43.2 CONS = ROOF/WAL  
AZIMUTH = 135 SKY-FORM-FACTOR = 1.0 ..

E-W HEIGHT = 2.5 WIDTH = 43.2 CONS = ROOF/WAL  
AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 14.4 WIDTH = 36.8 CONS = ROOF-1  
AZIMUTH = 135 TILT = 40 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 18.0 WIDTH = 46.0 CONS = ROOF-1  
AZIMUTH = 315 TILT = 40 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
\$ E Z - D O E S Y S T E M S I N P U T \$  
\$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #2 DDC CONTROL FOR BLDG. 724 \*

LINE-5 \*FLIGHT SIMULATOR \* ..

ABORT ERRORS ..

DIAGNOSTIC WARNINGS ..

SYSTEMS-REPORT VERIFICATION=(SV-A)

SUMMARY=(SS-A,SS-C,SS-K,SS-O)

HOURLY-DATA-SAVE = YES ..

# \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..

SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

SD\_WT\_HT\_W =DAY-SCHEDULE (1,24) (70.) ..

SD\_SM\_CL\_W =DAY-SCHEDULE (1,24) (76.) ..

SD\_WT\_CL\_W =DAY-SCHEDULE (1,24) (72.) ..

SD\_SM\_HT\_W =DAY-SCHEDULE (1,24) (74.) ..

SD\_WT\_HT\_D =DAY-SCHEDULE (1,24) (55.) ..

SD\_SM\_CL\_D =DAY-SCHEDULE (1,24) (85.) ..

SD\_WT\_CL\_D =DAY-SCHEDULE (1,24) (57.) ..

SD\_SM\_HT\_D =DAY-SCHEDULE (1,24) (83.) ..

SD\_FAN\_WK =DAY-SCHEDULE (1,4) (0.)

(5,16) (1.)

```

(17,24) (0.) ..
SD_FAN_END =DAY-SCHEDULE (1,24) (0.) ..
SD_WTHT_CR =DAY-SCHEDULE (1,24) (74.) ..
SD_SMCL_CR =DAY-SCHEDULE (1,24) (72.) ..
SD_WTCL_CR =DAY-SCHEDULE (1,24) (76.) ..
SD_SMHT_CR =DAY-SCHEDULE (1,24) (70.) ..
SD_OA%      =DAY-SCHEDULE (1,24) (0.1) ..

```



```

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..

SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT   =WEEK-SCHEDULE (ALL) SD_WT_HT_W ..

SW_SM_CL   =WEEK-SCHEDULE (ALL) SD_SM_CL_W ..

SW_WT_CL   =WEEK-SCHEDULE (ALL) SD_WT_CL_W ..

SW_SM_HT   =WEEK-SCHEDULE (ALL) SD_SM_HT_W ..

SW_FAN_CYC =WEEK-SCHEDULE (MON) SD_FAN_END
              (TUE) SD_FAN_END
              (WED) SD_FAN_WK
              (THU) SD_FAN_WK
              (FRI) SD_FAN_WK
              (SAT) SD_FAN_WK
              (SUN) SD_FAN_WK
              (HOL) SD_FAN_END ..

SW_WTHT_CR =WEEK-SCHEDULE (ALL) SD_WTHT_CR ..

SW_SMCL_CR =WEEK-SCHEDULE (ALL) SD_SMCL_CR ..

SW_WTCL_CR =WEEK-SCHEDULE (ALL) SD_WTCL_CR ..

SW_SMHT_CR =WEEK-SCHEDULE (ALL) SD_SMHT_CR ..

SW_OA%     =WEEK-SCHEDULE (ALL) SD_OA% ..

```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..
```

## \$ HEATING SEASON

```
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT 1 SW_OFF
              THRU DEC 31 SW_ON ..
```

## \$ COOLING SEASON

```
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT 1 SW_ON
              THRU DEC 31 SW_OFF ..
```

## \$ HEATING SET TEMP

S\_HT\_SET =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET =SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

S\_HRLY-RPT =SCHEDULE THRU JAN 3 SW\_OFF

THRU JAN 5 SW\_ON  
 THRU AUG 13 SW\_OFF  
 THRU AUG 15 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

## \$ HEATING SET TEMP

S\_HT\_SETCR =SCHEDULE THRU MAY 15 SW\_WTHT\_CR  
 THRU OCT 1 SW\_SMHT\_CR  
 THRU DEC 31 SW\_WTHT\_CR ..

## \$ COOLING SET TEMP

S\_CL\_SETCR =SCHEDULE THRU MAY 15 SW\_WTCL\_CR  
 THRU OCT 1 SW\_SMCL\_CR  
 THRU DEC 31 SW\_WTCL\_CR ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

## \$ ZONE DESCRIPTION

ZONE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

ZONE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

COMP\_AREA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SETCR COOL-TEMP-SCH = S\_CL\_SETCR  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

SIMUL\_AREA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL



SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ-PERIM =SYSTEM SYSTEM-TYPE = MZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 HEAT-CONTROL = COLDEST COOL-CONTROL = WARMEST  
 OA-CONTROL = FIXED SUPPLY-CFM = 6200.  
 RATED-CFM = 6200. MIN-OUTSIDE-AIR = 0.1  
 MIN-AIR-SCH = S\_OA% MAX-OA-FRACTION = 0.1  
 FAN-SCHEDULE = S\_ON SUPPLY-DELTA-T = 2.7  
 SUPPLY-KW = 0.00088 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  
 NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 1.0  
 COOLING-CAPACITY = 190200. COOL-SH-CAP = 152160.  
 HEATING-CAPACITY = -146100.  
 SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (ZONE\_1, ZONE\_2) ..

SING-ZN =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_ON COOLING-SCHEDULE = S\_ON  
 HEAT-SET-T = 120.0 OA-CONTROL = FIXED  
 SUPPLY-CFM = 6000. RATED-CFM = 6000.  
 MIN-OUTSIDE-AIR = 0.1 MIN-AIR-SCH = S\_OA%  
 MAX-OA-FRACTION = 0.1 FAN-SCHEDULE = S\_ON  
 SUPPLY-DELTA-T = 1.8 SUPPLY-KW = 0.00059  
 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY NIGHT-VENT-DT = 0.0  
 COOLING-CAPACITY = 165100. COOL-SH-CAP = 132080.  
 COOL-FT-MIN = 0. HEATING-CAPACITY = -120100.  
 MIN-HP-T = 0. MAX-HP-SUPP-T = 0. DEFROST-T = 0.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER SIZING-OPTION = COINCIDENT  
 RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (SIMUL\_AREA) ..

CRU'S =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_ON COOLING-SCHEDULE = S\_ON  
 SUPPLY-CFM = 17200. RATED-CFM = 17200.  
 FAN-SCHEDULE = S\_OFF SUPPLY-DELTA-T = 1.8  
 SUPPLY-KW = 0.00059 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  
 NIGHT-VENT-DT = 0.0 COOLING-CAPACITY = 322000.  
 COOL-SH-CAP = 322000. COOL-FT-MIN = 0.  
 HEATING-CAPACITY = -95600. MIN-HP-T = 0.  
 MAX-HP-SUPP-T = 0. DEFROST-T = 0.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = ELECTRIC SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (COMP\_AREA) ..

## \$ HOURLY REPORT DESCRIPTION

SPACE-MZ =REPORT-BLOCK VARIABLE-TYPE = ZONE\_2

```

                VARIABLE-LIST = (17,18,7,6) ..
SPACE-SZ  =REPORT-BLOCK VARIABLE-TYPE = SIMUL_AREA
                VARIABLE-LIST = (17,18,7,6) ..
SPACE-CRU =REPORT-BLOCK VARIABLE-TYPE = COMP_AREA
                VARIABLE-LIST = (17,18,7,6) ..
AHU-MZ    =REPORT-BLOCK VARIABLE-TYPE = MZ-PERIM
                VARIABLE-LIST = (3,5,6,18,19,17) ..
AHU-SZ    =REPORT-BLOCK VARIABLE-TYPE = SING-ZN
                VARIABLE-LIST = (3,5,6,17) ..
AHU-CRU   =REPORT-BLOCK VARIABLE-TYPE = CRU'S
                VARIABLE-LIST = (3,5,6,17) ..
ZONE-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
                REPORT-BLOCK = (SPACE-MZ,SPACE-SZ,SPACE-CRU)
..
AHU-HRLY  = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
                REPORT-BLOCK = (AHU-MZ,AHU-SZ,AHU-CRU)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #2 DDC CONTROL FOR BLDG. 724      *
        LINE-5 *FLIGHT SIMULATOR                      * ..

```

```

ABORT          ERRORS ..
DIAGNOSTIC     WARNINGS ..
PLANT-REPORT   VERIFICATION=(PV-A)
                SUMMARY=(PS-B,BEPS)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

PD_ON          =DAY-SCHEDULE (1,24) (1.) ..

PD_OFF         =DAY-SCHEDULE (1,24) (0.) ..

PW_OFF        =WEEK-SCHEDULE (ALL) PD_OFF ..

PW_ON         =WEEK-SCHEDULE (ALL) PD_ON ..

```

## \$ HEATING SEASON

```

P_HEAT        =SCHEDULE THRU MAY 15 PW_ON

```

EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:17:35 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 724 FLIGHT SIMULATOR  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-PERIM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -7.197                      | 5                       | 4                    | 0.F                  | 0.F                                     | 12153.                             | 38.157                          |
| FEB   | 0.00000                     |                         |                      |                      | -4.329                      | 2                       | 4                    | 10.F                 | 9.F                                     | 11024.                             | 38.157                          |
| MAR   | 0.00000                     |                         |                      |                      | -1.741                      | 2                       | 4                    | 25.F                 | 22.F                                    | 12153.                             | 38.157                          |
| APR   | 0.00000                     |                         |                      |                      | -0.685                      | 3                       | 17                   | 49.F                 | 45.F                                    | 12022.                             | 38.157                          |
| MAY   | 23.09587                    | 16                      | 2                    | 62.F                 | -0.350                      | 4                       | 17                   | 55.F                 | 53.F                                    | 11785.                             | 38.157                          |
| JUN   | 50.49344                    | 19                      | 15                   | 87.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 12022.                             | 38.157                          |
| JUL   | 60.92594                    | 23                      | 15                   | 97.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 12521.                             | 38.157                          |
| AUG   | 57.17864                    | 21                      | 15                   | 94.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 11785.                             | 38.157                          |
| SEP   | 41.65851                    | 7                       | 15                   | 92.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 12022.                             | 38.157                          |
| OCT   | 1.41983                     | 1                       | 15                   | 82.F                 | -0.684                      | 28                      | 17                   | 61.F                 | 56.F                                    | 12153.                             | 38.157                          |
| NOV   | 0.00000                     |                         |                      |                      | -0.712                      | 20                      | 17                   | 51.F                 | 46.F                                    | 10918.                             | 38.157                          |
| DEC   | 0.00000                     |                         |                      |                      | -5.292                      | 13                      | 6                    | 2.F                  | 1.F                                     | 12521.                             | 38.157                          |
| TOTAL | 234.772                     |                         |                      |                      | -20.989                     |                         |                      |                      |   | 143067.                            | 38.157                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      | -68.035                                 |                                    |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |

EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:17:35 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 724 FLIGHT SIMULATOR  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-PERIM TOPEKA, KS

| MONTH  | HOURS           |                 |                   |          | HOURS             |                   |         |          | HOURS            |                  |         |                         | COINCIDENT LOADS--                    |  |                 |        |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|---------|----------|------------------|------------------|---------|-------------------------|---------------------------------------|--|-----------------|--------|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | CYCLE ON | NIGHT<br>VENTING | FLOATING<br>WHEN | FANS ON | PEAK<br>COOLING<br>PEAK | HEATING<br>LOAD AT<br>COOLING<br>PEAK | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK | COOLING<br>PEAK | (KW)   |
| JAN    | 0               | 587             | 0                 | 157      | 744               | 0                 | 744     | 0        | 0                | 0                | 157     | -22.330                 | -22.330                               | 5.456                                  | 5.456           | 5.456  |
| FEB    | 0               | 477             | 0                 | 195      | 672               | 0                 | 672     | 0        | 0                | 0                | 195     | -0.982                  | -0.982                                | 5.456                                  | 5.456           | 5.456  |
| MAR    | 0               | 493             | 0                 | 251      | 744               | 0                 | 744     | 0        | 0                | 0                | 251     | -1.282                  | -1.282                                | 5.456                                  | 5.456           | 5.456  |
| APR    | 0               | 443             | 0                 | 277      | 720               | 0                 | 720     | 0        | 0                | 0                | 277     | -1.949                  | -1.949                                | 5.456                                  | 5.456           | 5.456  |
| MAY    | 376             | 223             | 0                 | 145      | 360               | 384               | 744     | 0        | 0                | 0                | 145     | 0.000                   | 0.000                                 | 5.456                                  | 5.456           | 5.456  |
| JUN    | 720             | 0               | 0                 | 0        | 0                 | 720               | 744     | 0        | 0                | 0                | 0       | 0.000                   | 0.000                                 | 38.157                                 | 38.157          | 38.157 |
| JUL    | 744             | 0               | 0                 | 0        | 0                 | 744               | 744     | 0        | 0                | 0                | 0       | 0.000                   | 0.000                                 | 38.157                                 | 38.157          | 38.157 |
| AUG    | 744             | 0               | 0                 | 0        | 0                 | 744               | 744     | 0        | 0                | 0                | 0       | 0.000                   | 0.000                                 | 38.157                                 | 38.157          | 38.157 |
| SEP    | 691             | 0               | 0                 | 29       | 0                 | 720               | 744     | 0        | 0                | 0                | 29      | 0.000                   | 0.000                                 | 38.157                                 | 38.157          | 38.157 |
| OCT    | 21              | 438             | 0                 | 285      | 24                | 24                | 744     | 0        | 0                | 0                | 285     | 0.000                   | 0.000                                 | 38.157                                 | 38.157          | 38.157 |
| NOV    | 0               | 471             | 0                 | 249      | 720               | 0                 | 744     | 0        | 0                | 0                | 249     | -0.903                  | -0.903                                | 5.456                                  | 5.456           | 5.456  |
| DEC    | 0               | 525             | 0                 | 219      | 744               | 0                 | 744     | 0        | 0                | 0                | 219     | -0.838                  | -0.838                                | 5.456                                  | 5.456           | 5.456  |
| ANNUAL | 3296            | 3657            | 0                 | 1807     | 5424              | 3336              | 8760    | 0        | 0                | 0                | 1807    |                         |                                       |  |                 |        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:17:35 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 724 FLIGHT SIMULATOR  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR SING-ZN TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.01049                     | 9 15                    | 53.F                 | 40.F                 | -15.505                     | 15 4                    | -8.F                 | -9.F                 | -48.805                                 | 3022.                              | 5.280                           |
| FEB   | 0.06809                     | 26 15                   | 60.F                 | 45.F                 | -11.042                     | 3 4                     | 0.F                  | -1.F                 | -41.831                                 | 2733.                              | 5.735                           |
| MAR   | 0.64169                     | 27 15                   | 70.F                 | 51.F                 | -7.947                      | 4 4                     | 14.F                 | 12.F                 | -31.508                                 | 3072.                              | 6.496                           |
| APR   | 4.53813                     | 27 15                   | 77.F                 | 68.F                 | -1.831                      | 5 7                     | 30.F                 | 27.F                 | -19.539                                 | 3352.                              | 8.372                           |
| MAY   | 8.53535                     | 31 18                   | 90.F                 | 76.F                 | -0.347                      | 1 4                     | 39.F                 | 37.F                 | -10.890                                 | 3852.                              | 8.651                           |
| JUN   | 14.75157                    | 30 14                   | 88.F                 | 76.F                 | -0.035                      | 2 4                     | 50.F                 | 49.F                 | -5.949                                  | 4469.                              | 10.148                          |
| JUL   | 19.72405                    | 23 15                   | 97.F                 | 79.F                 | 0.000                       | 4 4                     | 56.F                 | 55.F                 | 0.000                                   | 5120.                              | 11.347                          |
| AUG   | 19.26447                    | 20 14                   | 93.F                 | 78.F                 | -0.001                      | 4 4                     | 42.F                 | 42.F                 | -0.603                                  | 5116.                              | 10.814                          |
| SEP   | 9.90516                     | 7 15                    | 92.F                 | 76.F                 | -0.661                      | 12 7                    | 25.F                 | 25.F                 | -12.068                                 | 3955.                              | 10.459                          |
| OCT   | 5.72662                     | 5 15                    | 83.F                 | 68.F                 | -1.300                      | 20 4                    | 13.F                 | 12.F                 | -21.672                                 | 3560.                              | 9.016                           |
| NOV   | 1.49035                     | 23 14                   | 74.F                 | 62.F                 | -6.130                      | 3 4                     | 0.F                  | -1.F                 | -31.073                                 | 3013.                              | 7.474                           |
| DEC   | 0.08632                     | 28 15                   | 58.F                 | 47.F                 | -13.052                     | 13 8                    |                      |                      | -42.374                                 | 3041.                              | 5.590                           |
| TOTAL | 84.742                      |                         |                      |                      | -57.851                     |                         |                      |                      | -48.805                                 | 44305.                             | 11.347                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:17:35 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 724 FLIGHT SIMULATOR  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR SING-ZN TOPEKA, KS

| MONTH  | H O U R S                |                          |                            |                   |                            |                            |                              |                           |                                      |  | COINCIDENT LOADS--                             |  |  |
|--------|--------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|--|--|
|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |  |
| JAN    | 8                        | 736                      | 0                          | 0                 | 744                        | 744                        | 0                            | 0                         | 0                                    | 0.000  | 5.280  |  |  |
| FEB    | 21                       | 651                      | 0                          | 0                 | 672                        | 672                        | 0                            | 0                         | 0                                    | 0.000  | 5.735  |  |  |
| MAR    | 128                      | 616                      | 0                          | 0                 | 744                        | 744                        | 0                            | 0                         | 0                                    | 0.000  | 6.496  |  |  |
| APR    | 471                      | 248                      | 0                          | 1                 | 720                        | 720                        | 0                            | 0                         | 1                                    | 0.000  | 8.372  |  |  |
| MAY    | 640                      | 104                      | 0                          | 0                 | 744                        | 744                        | 0                            | 0                         | 0                                    | 0.000  | 7.907  |  |  |
| JUN    | 704                      | 16                       | 0                          | 0                 | 720                        | 720                        | 0                            | 0                         | 0                                    | 0.000  | 10.148   |  |  |
| JUL    | 744                      | 0                        | 0                          | 0                 | 744                        | 744                        | 0                            | 0                         | 0                                    | 0.000  | 11.347   |  |  |
| AUG    | 743                      | 1                        | 0                          | 0                 | 744                        | 744                        | 0                            | 0                         | 0                                    | 0.000  | 10.756   |  |  |
| SEP    | 570                      | 150                      | 0                          | 0                 | 720                        | 720                        | 0                            | 0                         | 0                                    | 0.000  | 10.459   |  |  |
| OCT    | 492                      | 252                      | 0                          | 0                 | 744                        | 744                        | 0                            | 0                         | 0                                    | 0.000  | 9.016  |  |  |
| NOV    | 203                      | 517                      | 0                          | 0                 | 720                        | 720                        | 0                            | 0                         | 0                                    | 0.000  | 7.474  |  |  |
| DEC    | 33                       | 711                      | 0                          | 0                 | 744                        | 744                        | 0                            | 0                         | 0                                    | 0.000  | 5.590  |  |  |
| ANNUAL | 4757                     | 4002                     | 0                          | 1                 | 8760                       | 8760                       | 0                            | 0                         | 1                                    |  |  |  |  |

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:17:35 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 724 FLIGHT SIMULATOR TOPEKA, KS                  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR CRU'S  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| ----- C O L I N G ----- H E A T I N G ----- E L E C -----                                      |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN  | 100.38735                   | 15                      | 11                   | -1.F -2.F            | 0.000                       |                         |                      |                      | 0.000                                   | 35818.                             | 59.700                          |
| FEB  | 90.95567                    | 3                       | 10                   | 10.F 8.F             | 0.000                       |                         |                      |                      | 0.000                                   | 32679.                             | 61.377                          |
| MAR  | 101.75665                   | 3                       | 7                    | 14.F 12.F            | 0.000                       |                         |                      |                      | 0.000                                   | 36961.                             | 64.123                          |
| APR  | 99.73093                    | 28                      | 15                   | 74.F 67.F            | 0.000                       |                         |                      |                      | 0.000                                   | 37284.                             | 66.665                          |
| MAY  | 104.52082                   | 16                      | 3                    | 61.F 59.F            | 0.000                       |                         |                      |                      | 0.000                                   | 39554.                             | 68.457                          |
| JUN  | 102.29000                   | 16                      | 11                   | 66.F 63.F            | 0.000                       |                         |                      |                      | 0.000                                   | 39226.                             | 66.515                          |
| JUL  | 106.57320                   | 30                      | 6                    | 63.F 60.F            | 0.000                       |                         |                      |                      | 0.000                                   | 41040.                             | 67.627                          |
| AUG  | 106.44633                   | 4                       | 15                   | 92.F 69.F            | 0.000                       |                         |                      |                      | 0.000                                   | 41181.                             | 71.045                          |
| SEP  | 101.72897                   | 15                      | 6                    | 46.F 45.F            | 0.000                       |                         |                      |                      | 0.000                                   | 38578.                             | 68.542                          |
| OCT  | 103.31563                   | 14                      | 13                   | 71.F 64.F            | 0.000                       |                         |                      |                      | 0.000                                   | 38648.                             | 67.038                          |
| NOV  | 98.70152                    | 3                       | 7                    | 19.F 17.F            | 0.000                       |                         |                      |                      | 0.000                                   | 36072.                             | 64.627                          |
| DEC  | 101.00494                   | 14                      | 7                    | 10.F 8.F             | 0.000                       |                         |                      |                      | 0.000                                   | 36148.                             | 61.436                          |
| TOTAL  | 1217.413                    |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 453192.                            | 71.045                          |
| MAX  |                             |                         |                      |                      | 246.669                     |                         |                      |                      |   |                                    |                                 |

| EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:17:35 SDL RUN 1 |                          |                          |  |                   |                            |                            |                  |                           |                           |                                      |  |  |
|---|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------|---------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 724 FLIGHT SIMULATOR TOPEKA, KS                   |                          |                          |  |                   |                            |                            |                  |                           |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR CRU'S  |                          |                          |  |                   |                            |                            |                  |                           |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----   |                          |                          |  |                   |                            |                            |                  |                           |                           |                                      |  |  |
| MONTH   | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON | HOURS<br>FANS<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | --COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN   | 530                      | 0                        | 0  | 214               | 744                        | 744                        | 530              | 530                       | 0                         | 0                                    | 0.000  | 54.234   |
| FEB   | 483                      | 0                        | 0  | 189               | 672                        | 672                        | 483              | 483                       | 0                         | 0                                    | 0.000  | 54.921   |
| MAR   | 546                      | 0                        | 0  | 198               | 744                        | 744                        | 546              | 546                       | 0                         | 0                                    | 0.000  | 55.087   |
| APR   | 538                      | 0                        | 0  | 182               | 720                        | 720                        | 538              | 538                       | 0                         | 0                                    | 0.000  | 66.665   |
| MAY   | 564                      | 0                        | 0  | 180               | 744                        | 744                        | 564              | 564                       | 0                         | 0                                    | 0.000  | 62.090   |
| JUN   | 564                      | 0                        | 0  | 156               | 720                        | 720                        | 564              | 564                       | 0                         | 0                                    | 0.000  | 63.713   |
| JUL   | 595                      | 0                        | 0  | 149               | 744                        | 744                        | 595              | 595                       | 0                         | 0                                    | 0.000  | 62.725   |
| AUG   | 590                      | 0                        | 0  | 154               | 744                        | 744                        | 590              | 590                       | 0                         | 0                                    | 0.000  | 70.934   |
| SEP   | 555                      | 0                        | 0  | 165               | 720                        | 720                        | 555              | 555                       | 0                         | 0                                    | 0.000  | 59.750   |
| OCT   | 554                      | 0                        | 0  | 190               | 744                        | 744                        | 554              | 554                       | 0                         | 0                                    | 0.000  | 66.094   |
| NOV   | 529                      | 0                        | 0  | 191               | 720                        | 720                        | 529              | 529                       | 0                         | 0                                    | 0.000  | 55.769   |
| DEC   | 537                      | 0                        | 0  | 207               | 744                        | 744                        | 537              | 537                       | 0                         | 0                                    | 0.000  | 54.877   |
| ANNUAL  | 6585                     | 0                        | 0  | 2175              | 8760                       | 8760                       | 6585             | 6585                      | 0                         | 0                                    |  |  |

EMC ENGINEERS INC. 80227 EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:17:35 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #2 DDC CONTROL FOR BLDG. 724 FLIGHT SIMULATOR  
 REPORT- PS-B TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|-----|--|---|---|
| JAN | 175.958<br>351.853<br>22/14                      | 175.958<br>351.853<br>22/14                         | 34.125<br>138.571<br>5/4                            |
| FEB | 160.082<br>359.069<br>26/13                      | 160.082<br>359.069<br>26/13                         | 24.200<br>124.264<br>2/4                            |
| MAR | 179.431<br>366.720<br>27/15                      | 179.431<br>366.720<br>27/15                         | 16.065<br>84.034<br>2/4                             |
| APR | 180.373<br>385.337<br>28/15                      | 180.373<br>385.337<br>28/15                         | 4.551<br>35.059<br>5/7                              |
| MAY | 196.690<br>438.023<br>27/15                      | 196.690<br>438.023<br>27/15                         | 1.381<br>21.306<br>1/4                              |
| JUN | 207.763<br>450.155<br>29/15                      | 207.763<br>450.155<br>29/15                         | 0.071<br>10.576<br>2/4                              |
| JUL | 221.429<br>462.366<br>23/13                      | 221.429<br>462.366<br>23/13                         | 0.000<br>0.000<br>31/1                              |
| AUG | 218.921<br>467.200<br>12/15                      | 218.921<br>467.200<br>12/15                         | 0.002<br>1.841<br>4/4                               |
| SEP | 201.057<br>457.919<br>7/15                       | 201.057<br>457.919<br>7/15                          | 1.208<br>20.576<br>12/7                             |
| OCT | 186.616<br>424.126<br>1/14                       | 186.616<br>424.126<br>1/14                          | 3.686<br>39.197<br>20/3                             |
| NOV | 171.765<br>376.142<br>23/13                      | 171.765<br>376.142<br>23/13                         | 11.702<br>51.674<br>3/3                             |
| DEC | 178.238<br>359.139<br>28/15                      | 178.238<br>359.139<br>28/15                         | 28.233<br>129.733<br>13/6                           |
|     | ONE YEAR<br>USE/PEAK                             | 2278.322<br>467.200                                 | 125.222<br>138.571                                  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:17:35 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 724 FLIGHT SIMULATOR  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 5.72        | 125.22      |
| SPACE COOL      | 413.83      | 0.00        |
| HVAC AUX        | 505.47      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 160.53      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 1192.66     | 0.00        |
| TOTAL           | 2278.21     | 125.22      |

TOTAL SITE ENERGY 2403.54 MBTU 183.5 KBTU/SQFT-YR GROSS-AREA 228.8 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 6967.03 MBTU 531.8 KBTU/SQFT-YR GROSS-AREA 663.1 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 46.7  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 2.5 WIDTH = 43.2 CONS = ROOF/WAL  
AZIMUTH = 135 SKY-FORM-FACTOR = 1.0 ..

E-W HEIGHT = 2.5 WIDTH = 43.2 CONS = ROOF/WAL  
AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 14.4 WIDTH = 36.8 CONS = ROOF-1  
AZIMUTH = 135 TILT = 40 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 18.0 WIDTH = 46.0 CONS = ROOF-1  
AZIMUTH = 315 TILT = 40 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
\$ E Z - D O E S Y S T E M S I N P U T \$  
\$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #3 ECONOMIZER FOR BLDG. #724 \*

LINE-5 \*FLIGHT SIMULATOR \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
SYSTEMS-REPORT VERIFICATION=(SV-A)  
SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
SD\_WT\_HT\_W =DAY-SCHEDULE (1,4) (55.)  
(5,16) (74.)  
(17,24) (55.) ..  
SD\_SM\_CL\_W =DAY-SCHEDULE (1,4) (85.)  
(5,16) (72.)  
(17,24) (85.) ..  
SD\_WT\_CL\_W =DAY-SCHEDULE (1,4) (57.)  
(5,16) (76.)  
(17,24) (57.) ..  
SD\_SM\_HT\_W =DAY-SCHEDULE (1,4) (83.)



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(5,16) (70.)
(17,24) (83.) ..
SD_WT_HT_D =DAY-SCHEDULE (1,24) (55.) ..
SD_SM_CL_D =DAY-SCHEDULE (1,24) (85.) ..
SD_WT_CL_D =DAY-SCHEDULE (1,24) (57.) ..
SD_SM_HT_D =DAY-SCHEDULE (1,24) (83.) ..
SD_FAN_WK =DAY-SCHEDULE (1,4) (0.)
(5,16) (1.)
(17,24) (0.) ..
SD_FAN_END =DAY-SCHEDULE (1,24) (0.) ..
SD_WTHT_CR =DAY-SCHEDULE (1,24) (74.) ..
SD_SMCL_CR =DAY-SCHEDULE (1,24) (72.) ..
SD_WTCL_CR =DAY-SCHEDULE (1,24) (76.) ..
SD_SMHT_CR =DAY-SCHEDULE (1,24) (70.) ..

SW_ON =WEEK-SCHEDULE (ALL) SD_ON ..

SW_OFF =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT =WEEK-SCHEDULE (MON) SD_WT_HT_D
(TUE) SD_WT_HT_D
(WED) SD_WT_HT_W
(THU) SD_WT_HT_W
(FRI) SD_WT_HT_W
(SAT) SD_WT_HT_W
(SUN) SD_WT_HT_W
(HOL) SD_WT_HT_D ..

SW_SM_CL =WEEK-SCHEDULE (MON) SD_SM_CL_D
(TUE) SD_SM_CL_D
(WED) SD_SM_CL_W
(THU) SD_SM_CL_W
(FRI) SD_SM_CL_W
(SAT) SD_SM_CL_W
(SUN) SD_SM_CL_W
(HOL) SD_SM_CL_D ..

SW_WT_CL =WEEK-SCHEDULE (MON) SD_WT_CL_D
(TUE) SD_WT_CL_D
(WED) SD_WT_CL_W
(THU) SD_WT_CL_W
(FRI) SD_WT_CL_W
(SAT) SD_WT_CL_W
(SUN) SD_WT_CL_W
(HOL) SD_WT_CL_D ..

SW_SM_HT =WEEK-SCHEDULE (MON) SD_SM_HT_D
(TUE) SD_SM_HT_D
(WED) SD_SM_HT_W
(THU) SD_SM_HT_W
(FRI) SD_SM_HT_W
(SAT) SD_SM_HT_W
(SUN) SD_SM_HT_W
(HOL) SD_SM_HT_D ..

SW_FAN_CYC =WEEK-SCHEDULE (MON) SD_FAN_END

```

(TUE) SD\_FAN\_END  
 (WED) SD\_FAN\_WK  
 (THU) SD\_FAN\_WK  
 (FRI) SD\_FAN\_WK  
 (SAT) SD\_FAN\_WK  
 (SUN) SD\_FAN\_WK  
 (HOL) SD\_FAN\_END ..

SW\_WTHT\_CR =WEEK-SCHEDULE (ALL) SD\_WTHT\_CR ..

SW\_SMCL\_CR =WEEK-SCHEDULE (ALL) SD\_SMCL\_CR ..

SW\_WTCL\_CR =WEEK-SCHEDULE (ALL) SD\_WTCL\_CR ..

SW\_SMHT\_CR =WEEK-SCHEDULE (ALL) SD\_SMHT\_CR ..

# \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

# \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

# \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

# \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

# \$ HEATING SET TEMP

S\_HT\_SET =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

# \$ COOLING SET TEMP

S\_CL\_SET =SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

S\_HRLY-RPT =SCHEDULE THRU JAN 3 SW\_OFF  
 THRU JAN 5 SW\_ON  
 THRU AUG 13 SW\_OFF  
 THRU AUG 15 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

# \$ HEATING SET TEMP

S\_HT\_SETCR =SCHEDULE THRU MAY 15 SW\_WTHT\_CR  
 THRU OCT 1 SW\_SMHT\_CR  
 THRU DEC 31 SW\_WTHT\_CR ..

## \$ COOLING SET TEMP

S\_CL\_SETCR =SCHEDULE THRU MAY 15 SW\_WTCL\_CR  
 THRU OCT 1 SW\_SMCL\_CR  
 THRU DEC 31 SW\_WTCL\_CR ..

## \$ ZONE DESCRIPTION


ZONE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..


ZONE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

COMP\_AREA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SETCR COOL-TEMP-SCH = S\_CL\_SETCR  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

SIMUL\_AREA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ-PERIM =SYSTEM SYSTEM-TYPE = MZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHD PREHEAT-T = 0.0  
ECONO-LIMIT-T = 69.0 HEAT-CONTROL = COLDEST   
 COOL-CONTROL = WARMEST SUPPLY-CFM = 6200.  
 RATED-CFM = 6200. MIN-OUTSIDE-AIR = 0.1  
 FAN-SCHEDULE = S\_FAN\_CYC SUPPLY-DELTA-T = 2.7  
 SUPPLY-KW = 0.00088 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  
 NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 1.0  
 COOLING-CAPACITY = 190200. COOL-SH-CAP = 152160.  
 HEATING-CAPACITY = -146100.  
 SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (ZONE\_1, ZONE\_2) ..

SING-ZN =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_ON COOLING-SCHEDULE = S\_ON  
 HEAT-SET-T = 120.0 ECONO-LIMIT-T = 69.0   
 SUPPLY-CFM = 6000. RATED-CFM = 6000.

```

MIN-OUTSIDE-AIR = 0.1  FAN-SCHEDULE = S_FAN_CYC
SUPPLY-DELTA-T = 1.8  SUPPLY-KW = 0.00059
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  NIGHT-VENT-DT = 0.0
COOLING-CAPACITY = 165100.  COOL-SH-CAP = 132080.
COOL-FT-MIN = 0.  HEATING-CAPACITY = -120100.
MIN-HP-T = 0.  MAX-HP-SUPP-T = 0.  DEFROST-T = 0.
CRANKCASE-MAX-T = 0.  OUTSIDE-FAN-T = 45.
HEAT-SOURCE = HOT-WATER  SIZING-OPTION = COINCIDENT
RETURN-AIR-PATH = DUCT
ZONE-NAMES = (SIMUL_AREA) ..

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CRU'S      =SYSTEM  SYSTEM-TYPE = PSZ
MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
HEATING-SCHEDULE = S_ON  COOLING-SCHEDULE = S_ON
SUPPLY-CFM = 17200.  RATED-CFM = 17200.
FAN-SCHEDULE = S_OFF  SUPPLY-DELTA-T = 1.8
SUPPLY-KW = 0.00059  NIGHT-CYCLE-CTRL = CYCLE-ON-ANY
NIGHT-VENT-DT = 0.0  COOLING-CAPACITY = 322000.
COOL-SH-CAP = 322000.  COOL-FT-MIN = 0.
HEATING-CAPACITY = -95600.  MIN-HP-T = 0.
MAX-HP-SUPP-T = 0.  DEFROST-T = 0.
CRANKCASE-MAX-T = 0.  OUTSIDE-FAN-T = 45.
HEAT-SOURCE = ELECTRIC  SIZING-OPTION = COINCIDENT
ZONE-NAMES = (COMP_AREA) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

SPACE-MZ  =REPORT-BLOCK VARIABLE-TYPE = ZONE_2
          VARIABLE-LIST = (17,18,7,6) ..
SPACE-SZ  =REPORT-BLOCK VARIABLE-TYPE = SIMUL_AREA
          VARIABLE-LIST = (17,18,7,6) ..
SPACE-CRU =REPORT-BLOCK VARIABLE-TYPE = COMP_AREA
          VARIABLE-LIST = (17,18,7,6) ..
AHU-MZ    =REPORT-BLOCK VARIABLE-TYPE = MZ-PERIM
          VARIABLE-LIST = (3,5,6,18,19,17) ..
AHU-SZ    =REPORT-BLOCK VARIABLE-TYPE = SING-ZN
          VARIABLE-LIST = (3,5,6,17) ..
AHU-CRU   =REPORT-BLOCK VARIABLE-TYPE = CRU'S
          VARIABLE-LIST = (3,5,6,17) ..
ZONE-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (SPACE-MZ,SPACE-SZ,SPACE-CRU)
..
AHU-HRLY  = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (AHU-MZ,AHU-SZ,AHU-CRU)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

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$-----$
$ E Z - D O E  P L A N T S  I N P U T $
$-----$

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EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:30:16 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #724 FLIGHT SIMULATOR  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-PERIM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                            |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -17.183                     | 19                      | 5                    | 29.F                 | 28.F                                    | 11154.                             | 38.157                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -14.014                     | 23                      | 5                    | 31.F                 | 28.F                                    | 10233.                             | 38.157                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -12.567                     | 2                       | 5                    | 24.F                 | 21.F                                    | 11252.                             | 38.157                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -5.638                      | 6                       | 5                    | 36.F                 | 31.F                                    | 11825.                             | 38.157                          |
| MAY   | 12.59915                    | 22                      | 14                   | 79.F                 | 69.F                                    | -1.357                      | 4                       | 5                    | 58.F                 | 56.F                                    | 11632.                             | 38.157                          |
| JUN   | 37.73230                    | 23                      | 6                    | 68.F                 | 67.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 11760.                             | 38.157                          |
| JUL   | 48.56630                    | 13                      | 13                   | 90.F                 | 79.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 12062.                             | 38.157                          |
| AUG   | 42.63340                    | 27                      | 7                    | 68.F                 | 67.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 11026.                             | 38.157                          |
| SEP   | 27.87341                    | 23                      | 11                   | 68.F                 | 67.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 11929.                             | 38.157                          |
| OCT   | 0.82629                     | 1                       | 15                   | 82.F                 | 67.F                                    | -3.995                      | 19                      | 5                    | 46.F                 | 45.F                                    | 12120.                             | 38.157                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -10.639                     | 30                      | 5                    | 29.F                 | 26.F                                    | 10383.                             | 38.157                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -16.470                     | 14                      | 5                    | 11.F                 | 10.F                                    | 11719.                             | 38.157                          |
| TOTAL | 170.231                     |                         |                      |                      |   | -81.863                     |                         |                      |                      |   | 137089.                            |                                 |
| MAX   |                             |                         |                      |                      | 221.253                                 |                             |                         |                      |                      | -145.670                                |                                    | 38.157                          |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:30:16 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #724 FLIGHT SIMULATOR  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-PERIM TOPEKA, KS

| MONTH  | H O U R S       |                 |                   |          | H O U R S         |                   |         |                   | C O I N C I D E N T |                   |                   |         | C O I N C I D E N T |                   |         |                   |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|---------|-------------------|---------------------|-------------------|-------------------|---------|---------------------|-------------------|---------|-------------------|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | COOLING<br>AVAIL. | FANS ON             | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | HEATING<br>AVAIL.   | COOLING<br>AVAIL. | FANS ON | COOLING<br>AVAIL. |
| JAN    | 0               | 364             | 0                 | 380      | 744               | 0                 | 561     | 0                 | 561                 | 0                 | 0                 | 297     | 0                   | 0                 | 197     | 0.000             |
| FEB    | 0               | 349             | 0                 | 323      | 672               | 0                 | 527     | 0                 | 527                 | 0                 | 0                 | 287     | 0                   | 0                 | 178     | 0.000             |
| MAR    | 0               | 345             | 0                 | 399      | 744               | 0                 | 579     | 0                 | 579                 | 0                 | 0                 | 315     | 0                   | 0                 | 234     | 0.000             |
| APR    | 0               | 278             | 0                 | 442      | 720               | 0                 | 684     | 0                 | 684                 | 0                 | 0                 | 420     | 0                   | 0                 | 406     | 5.456             |
| MAY    | 136             | 112             | 0                 | 496      | 360               | 384               | 716     | 384               | 716                 | 384               | 384               | 464     | 0                   | 0                 | 468     | 38.157            |
| JUN    | 378             | 0               | 0                 | 342      | 0                 | 720               | 672     | 408               | 672                 | 408               | 408               | 294     | 0                   | 0                 | 294     | 38.157            |
| JUL    | 497             | 0               | 0                 | 247      | 0                 | 744               | 660     | 384               | 660                 | 384               | 384               | 163     | 0                   | 0                 | 163     | 38.157            |
| AUG    | 438             | 0               | 0                 | 306      | 0                 | 744               | 605     | 353               | 605                 | 353               | 353               | 167     | 0                   | 0                 | 167     | 38.157            |
| SEP    | 262             | 0               | 0                 | 458      | 0                 | 720               | 703     | 439               | 703                 | 439               | 439               | 441     | 0                   | 0                 | 441     | 38.157            |
| OCT    | 7               | 253             | 0                 | 484      | 720               | 24                | 738     | 474               | 738                 | 474               | 474               | 478     | 0                   | 0                 | 478     | 38.157            |
| NOV    | 0               | 314             | 0                 | 406      | 720               | 0                 | 622     | 394               | 622                 | 394               | 394               | 308     | 0                   | 0                 | 308     | 5.456             |
| DEC    | 0               | 404             | 0                 | 340      | 744               | 0                 | 597     | 321               | 597                 | 321               | 321               | 193     | 0                   | 0                 | 193     | 0.000             |
| ANNUAL | 1718            | 2419            | 0                 | 4623     | 5424              | 3336              | 7664    | 4556              | 7664                | 4556              |                   |         |                     |                   |         |                   |

EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:30:16 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #724 FLIGHT SIMULATOR TOPEKA, KS  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR SING-ZN

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                                 |        |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|--------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |        |
| JAN   | 0.00000                     |                         |                      |                      | -3.688                      | 5                       | 1.1                  | 0.1                  | -55.946                                 | 1967.                              | 5.188                           |        |
| FEB   | 0.00377                     | 28                      | 56.1                 | 43.1                 | -3.161                      | 2                       | 8.1                  | 6.1                  | -54.303                                 | 1744.                              | 5.188                           |        |
| MAR   | 0.66329                     | 24                      | 64.1                 | 64.1                 | -3.129                      | 16                      | 21.1                 | 19.1                 | -52.947                                 | 1964.                              | 12.628                          |        |
| APR   | 4.57602                     | 20                      | 65.1                 | 62.1                 | -2.424                      | 6                       | 36.1                 | 31.1                 | -47.094                                 | 2465.                              | 9.748                           |        |
| MAY   | 5.37330                     | 15                      | 79.1                 | 69.1                 | -2.135                      | 16                      | 62.1                 | 59.1                 | -48.096                                 | 2622.                              | 10.662                          |        |
| JUN   | 6.18788                     | 29                      | 71.1                 | 70.1                 | -1.733                      | 10                      | 79.1                 | 66.1                 | -22.988                                 | 2623.                              | 9.740                           |        |
| JUL   | 9.24953                     | 13                      | 78.1                 | 74.1                 | -1.681                      | 31                      | 68.1                 | 66.1                 | -20.816                                 | 2996.                              | 10.145                          |        |
| AUG   | 8.06227                     | 24                      | 79.1                 | 72.1                 | -1.501                      | 25                      | 50.1                 | 46.1                 | -21.820                                 | 2737.                              | 10.171                          |        |
| SEP   | 4.38171                     | 7                       | 75.1                 | 71.1                 | -1.908                      | 30                      | 57.1                 | 57.1                 | -26.398                                 | 2575.                              | 9.899                           |        |
| OCT   | 5.09613                     | 14                      | 62.1                 | 60.1                 | -2.159                      | 5                       | 16.1                 | 15.1                 | -40.835                                 | 2609.                              | 10.298                          |        |
| NOV   | 1.43159                     | 6                       | 64.1                 | 58.1                 | -2.740                      | 2                       | 11.1                 | 10.1                 | -48.373                                 | 1938.                              | 9.084                           |        |
| DEC   | 0.00000                     |                         |                      |                      | -3.454                      | 14                      |                      |                      | -54.673                                 | 2004.                              | 5.088                           |        |
| TOTAL | 45.026                      |                         |                      |                      | -29.713                     |                         |                      |                      | -55.946                                 | 28245.                             |                                 | 12.628 |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |        |

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EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:30:16 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #724 FLIGHT SIMULATOR TOPEKA, KS  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR SING-ZN

| MONTH  | N U M B E R     |                 |                   |                   | H O U R S         |                   |            |            | C O I N C I D E N T |                   |            |            | C O I N C I D E N T |                   |            |            |
|--------|-----------------|-----------------|-------------------|-------------------|-------------------|-------------------|------------|------------|---------------------|-------------------|------------|------------|---------------------|-------------------|------------|------------|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | COOL-HEAT<br>LOAD | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS<br>ON | FANS<br>ON | HEATING<br>AVAIL.   | COOLING<br>AVAIL. | FANS<br>ON | FANS<br>ON | HEATING<br>AVAIL.   | COOLING<br>AVAIL. | FANS<br>ON | FANS<br>ON |
| JAN    | 0               | 237             | 0                 | 0                 | 744               | 744               | 446        | 182        | 744                 | 744               | 446        | 182        | 744                 | 744               | 446        | 182        |
| FEB    | 1               | 201             | 0                 | 0                 | 672               | 672               | 394        | 154        | 672                 | 672               | 394        | 154        | 672                 | 672               | 394        | 154        |
| MAR    | 25              | 205             | 0                 | 0                 | 744               | 744               | 431        | 167        | 744                 | 744               | 431        | 167        | 744                 | 744               | 431        | 167        |
| APR    | 152             | 176             | 0                 | 0                 | 720               | 720               | 474        | 210        | 720                 | 720               | 474        | 210        | 720                 | 720               | 474        | 210        |
| MAY    | 201             | 169             | 0                 | 0                 | 744               | 744               | 492        | 240        | 744                 | 744               | 492        | 240        | 744                 | 744               | 492        | 240        |
| JUN    | 219             | 141             | 0                 | 0                 | 720               | 720               | 450        | 186        | 720                 | 720               | 450        | 186        | 720                 | 720               | 450        | 186        |
| JUL    | 278             | 151             | 0                 | 0                 | 744               | 744               | 455        | 179        | 744                 | 744               | 455        | 179        | 744                 | 744               | 455        | 179        |
| AUG    | 250             | 139             | 0                 | 0                 | 744               | 744               | 421        | 169        | 744                 | 744               | 421        | 169        | 744                 | 744               | 421        | 169        |
| SEP    | 162             | 156             | 0                 | 0                 | 720               | 720               | 491        | 227        | 720                 | 720               | 491        | 227        | 720                 | 720               | 491        | 227        |
| OCT    | 191             | 162             | 0                 | 0                 | 744               | 744               | 499        | 235        | 744                 | 744               | 499        | 235        | 744                 | 744               | 499        | 235        |
| NOV    | 57              | 176             | 0                 | 0                 | 720               | 720               | 419        | 191        | 720                 | 720               | 419        | 191        | 720                 | 720               | 419        | 191        |
| DEC    | 0               | 232             | 0                 | 0                 | 744               | 744               | 453        | 177        | 744                 | 744               | 453        | 177        | 744                 | 744               | 453        | 177        |
| ANNUAL | 1536            | 2145            | 0                 | 0                 | 8760              | 8760              | 5425       | 2317       | 8760                | 8760              | 5425       | 2317       | 8760                | 8760              | 5425       | 2317       |

EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:30:16 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #724 FLIGHT SIMULATOR  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR CRU'S TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 100.38735                   | 15                      | 11                   | -2.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 35818.                             | 59.700                          |
| FEB   | 90.95567                    | 3                       | 10                   | 10.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 32679.                             | 61.377                          |
| MAR   | 101.75665                   | 3                       | 7                    | 14.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 36961.                             | 64.123                          |
| APR   | 99.73093                    | 28                      | 15                   | 74.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 37284.                             | 66.665                          |
| MAY   | 104.52082                   | 16                      | 3                    | 61.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 39554.                             | 68.457                          |
| JUN   | 102.29000                   | 16                      | 11                   | 66.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 39226.                             | 66.515                          |
| JUL   | 106.57320                   | 30                      | 6                    | 63.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 41040.                             | 67.627                          |
| AUG   | 106.44633                   | 4                       | 15                   | 92.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 41181.                             | 71.045                          |
| SEP   | 101.72897                   | 15                      | 6                    | 46.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 38578.                             | 68.542                          |
| OCT   | 103.31563                   | 14                      | 13                   | 71.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 38648.                             | 67.038                          |
| NOV   | 98.70152                    | 3                       | 7                    | 19.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 36072.                             | 64.627                          |
| DEC   | 101.00494                   | 14                      | 7                    | 10.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 36148.                             | 61.436                          |
| TOTAL | 1217.413                    |                         |                      |                      | 0.000                       |                         |                      |                      |   | 453192.                            | 71.045                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      | 0.000                                   |                                    |                                 |

EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:30:16 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #724 FLIGHT SIMULATOR  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR CRU'S TOPEKA, KS

| MONTH  | HOURS           |                 |                   | N U M B E R       |                            |                            | H O U R S                 |                           |                                      | HOURS  |  |  | --COINCIDENT LOADS-- |  |  |
|--------|-----------------|-----------------|-------------------|-------------------|----------------------------|----------------------------|---------------------------|---------------------------|--------------------------------------|--|--|--|----------------------|--|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |                      |  |  |
| JAN    | 530             | 0               | 0                 | 214               | 744                        | 744                        | 530                       | 530                       | 0                                    | 0.000  | 54.234   |  |                      |  |  |
| FEB    | 483             | 0               | 0                 | 189               | 672                        | 672                        | 483                       | 483                       | 0                                    | 0.000  | 54.921   |  |                      |  |  |
| MAR    | 546             | 0               | 0                 | 198               | 744                        | 744                        | 546                       | 546                       | 0                                    | 0.000  | 55.087   |  |                      |  |  |
| APR    | 538             | 0               | 0                 | 182               | 720                        | 720                        | 538                       | 538                       | 0                                    | 0.000  | 66.665   |  |                      |  |  |
| MAY    | 564             | 0               | 0                 | 180               | 744                        | 744                        | 564                       | 564                       | 0                                    | 0.000  | 62.090   |  |                      |  |  |
| JUN    | 564             | 0               | 0                 | 156               | 720                        | 720                        | 564                       | 564                       | 0                                    | 0.000  | 63.713   |  |                      |  |  |
| JUL    | 595             | 0               | 0                 | 149               | 744                        | 744                        | 595                       | 595                       | 0                                    | 0.000  | 62.725   |  |                      |  |  |
| AUG    | 590             | 0               | 0                 | 154               | 744                        | 744                        | 590                       | 590                       | 0                                    | 0.000  | 70.934   |  |                      |  |  |
| SEP    | 555             | 0               | 0                 | 165               | 720                        | 720                        | 555                       | 555                       | 0                                    | 0.000  | 59.750   |  |                      |  |  |
| OCT    | 554             | 0               | 0                 | 190               | 744                        | 744                        | 554                       | 554                       | 0                                    | 0.000  | 66.094   |  |                      |  |  |
| NOV    | 529             | 0               | 0                 | 191               | 720                        | 720                        | 529                       | 529                       | 0                                    | 0.000  | 55.769   |  |                      |  |  |
| DEC    | 537             | 0               | 0                 | 207               | 744                        | 744                        | 537                       | 537                       | 0                                    | 0.000  | 54.877   |  |                      |  |  |
| ANNUAL | 6585            | 0               | 0                 | 2175              | 8760                       | 8760                       | 6585                      | 6585                      | 0                                    |  |  |  |                      |  |  |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:30:16 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #724 FLIGHT SIMULATOR  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>168.727<br>356.480<br>12/12<br>153.923<br>360.026<br>26/13<br>172.705<br>366.463<br>9/14<br>177.038<br>378.164<br>28/15<br>188.145<br>439.835<br>21/15<br>194.782<br>453.047<br>29/15<br>206.944<br>463.797<br>23/13<br>201.562<br>467.694<br>12/15<br>189.943<br>460.177<br>7/15<br>183.287<br>427.911<br>1/14<br>166.440<br>369.758<br>23/13<br>171.971<br>361.265<br>28/15 | NATURAL-GAS<br>31.093<br>251.339<br>26/ 5<br>25.927<br>246.622<br>23/ 5<br>23.845<br>249.676<br>16/ 5<br>12.903<br>243.323<br>6/ 5<br>5.918<br>171.140<br>4/ 5<br>3.051<br>39.119<br>10/17<br>2.981<br>35.569<br>31/17<br>2.668<br>37.209<br>25/17<br>3.360<br>44.690<br>30/17<br>9.958<br>189.480<br>19/ 5<br>20.380<br>244.270<br>30/ 5<br>30.140<br>251.571<br>14/ 5 |
|-----|--|--|---|
| JAN |  |  |   |
| FEB |  |  |   |
| MAR |  |  |   |
| APR |  |  |   |
| MAY |  |  |   |
| JUN |  |  |   |
| JUL |  |  |   |
| AUG |  |  |   |
| SEP |  |  |   |
| OCT |  |  |   |
| NOV |  |  |   |
| DEC |  |  |   |
|     | ONE YEAR<br>USE/PEAK                             | 2175.470<br>467.694  | 172.223<br>251.571  |



EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:30:16 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #724 FLIGHT SIMULATOR  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 7.27        | 172.22      |
| SPACE COOL      | 372.63      | 0.00        |
| HVAC AUX        | 442.28      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 160.53      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 1192.66     | 0.00        |
| TOTAL           | 2175.37     | 172.22      |

TOTAL SITE ENERGY 2347.69 MBTU 179.2 KBTU/SQFT-YR GROSS-AREA 223.5 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 6705.16 MBTU 511.8 KBTU/SQFT-YR GROSS-AREA 638.2 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 62.0  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 2.5 WIDTH = 43.2 CONS = ROOF/WAL  
AZIMUTH = 135 SKY-FORM-FACTOR = 1.0 ..

E-W HEIGHT = 2.5 WIDTH = 43.2 CONS = ROOF/WAL  
AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 14.4 WIDTH = 36.8 CONS = ROOF-1  
AZIMUTH = 135 TILT = 40 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 18.0 WIDTH = 46.0 CONS = ROOF-1  
AZIMUTH = 315 TILT = 40 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
\$ E Z - D O E S Y S T E M S I N P U T \$  
\$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #4 NIGHT INFILTRATION FOR BLDG. #724\*

LINE-5 \*FLIGHT SIMULATOR \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
SYSTEMS-REPORT VERIFICATION=(SV-A)  
SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
SD\_WT\_HT\_W =DAY-SCHEDULE (1,24) (74.) ..  
SD\_SM\_CL\_W =DAY-SCHEDULE (1,24) (72.) ..  
SD\_WT\_CL\_W =DAY-SCHEDULE (1,24) (76.) ..  
SD\_SM\_HT\_W =DAY-SCHEDULE (1,24) (70.) ..  
SD\_WT\_HT\_D =DAY-SCHEDULE (1,24) (55.) ..  
SD\_SM\_CL\_D =DAY-SCHEDULE (1,24) (85.) ..  
SD\_WT\_CL\_D =DAY-SCHEDULE (1,24) (57.) ..  
SD\_SM\_HT\_D =DAY-SCHEDULE (1,24) (83.) ..  
SD\_FAN\_WK =DAY-SCHEDULE (1,4) (0.)  
(5,16) (1.)

```

                (17,24) (0.) ..
SD_FAN_END =DAY-SCHEDULE (1,24) (0.) ..
SD_WTHT_CR =DAY-SCHEDULE (1,24) (74.) ..
SD_SMCL_CR =DAY-SCHEDULE (1,24) (72.) ..
SD_WTCL_CR =DAY-SCHEDULE (1,24) (76.) ..
SD_SMHT_CR =DAY-SCHEDULE (1,24) (70.) ..
SD_OA%      =DAY-SCHEDULE (1,4) (0.)
                (5,16) (0.1)
                (17,24) (0.) ..

```



```

SW_ON       =WEEK-SCHEDULE (ALL) SD_ON ..

SW_OFF      =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT    =WEEK-SCHEDULE (ALL) SD_WT_HT_W ..

SW_SM_CL    =WEEK-SCHEDULE (ALL) SD_SM_CL_W ..

SW_WT_CL    =WEEK-SCHEDULE (ALL) SD_WT_CL_W ..

SW_SM_HT    =WEEK-SCHEDULE (ALL) SD_SM_HT_W ..

SW_FAN_CYC  =WEEK-SCHEDULE (MON) SD_FAN_END
                (TUE) SD_FAN_END
                (WED) SD_FAN_WK
                (THU) SD_FAN_WK
                (FRI) SD_FAN_WK
                (SAT) SD_FAN_WK
                (SUN) SD_FAN_WK
                (HOL) SD_FAN_END ..

SW_WTHT_CR  =WEEK-SCHEDULE (ALL) SD_WTHT_CR ..

SW_SMCL_CR  =WEEK-SCHEDULE (ALL) SD_SMCL_CR ..

SW_WTCL_CR  =WEEK-SCHEDULE (ALL) SD_WTCL_CR ..

SW_SMHT_CR  =WEEK-SCHEDULE (ALL) SD_SMHT_CR ..

SW_OA%      =WEEK-SCHEDULE (MON) SD_OFF
                (TUE) SD_OFF
                (WED) SD_OA%
                (THU) SD_OA%
                (FRI) SD_OA%
                (SAT) SD_OA%
                (SUN) SD_OA%
                (HOL) SD_OFF ..

```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..
```

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET =SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

S\_HRLY-RPT =SCHEDULE THRU JAN 3 SW\_OFF  
 THRU JAN 5 SW\_ON  
 THRU AUG 13 SW\_OFF  
 THRU AUG 15 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

## \$ HEATING SET TEMP

S\_HT\_SETCR =SCHEDULE THRU MAY 15 SW\_WTHT\_CR  
 THRU OCT 1 SW\_SMHT\_CR  
 THRU DEC 31 SW\_WTHT\_CR ..

## \$ COOLING SET TEMP

S\_CL\_SETCR =SCHEDULE THRU MAY 15 SW\_WTCL\_CR  
 THRU OCT 1 SW\_SMCL\_CR  
 THRU DEC 31 SW\_WTCL\_CR ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

## \$ ZONE DESCRIPTION

ZONE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

ZONE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

COMP\_AREA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0

```

HEAT-TEMP-SCH = S_HT_SETCR COOL-TEMP-SCH = S_CL_SETCR
ZONE-TYPE = CONDITIONED
THERMOSTAT-TYPE = PROPORTIONAL
SIZING-OPTION = FROM-LOADS ..

```

```

SIMUL_AREA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0
HEAT-TEMP-SCH = S_HT_SET COOL-TEMP-SCH = S_CL_SET
ZONE-TYPE = CONDITIONED
THERMOSTAT-TYPE = PROPORTIONAL
SIZING-OPTION = FROM-LOADS ..

```

## \$ SYSTEM DESCRIPTION

```

MZ-PERIM =SYSTEM SYSTEM-TYPE = MZS
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0
HEATING-SCHEDULE = S_HE-SCHED
COOLING-SCHEDULE = S_CL_SCHED PREHEAT-T = 0.0
OA-CONTROL = FIXED SUPPLY-CFM = 6200.
RATED-CFM = 6200. MIN-AIR-SCH = S_OA%
MAX-OA-FRACTION = 0.1 FAN-SCHEDULE = S_ON
SUPPLY-DELTA-T = 2.7 SUPPLY-KW = 0.00088
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY NIGHT-VENT-DT = 0.0
MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 190200.
COOL-SH-CAP = 152160. HEATING-CAPACITY = -146100.
SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DUCT
ZONE-NAMES = (ZONE_1, ZONE_2) ..

```

```

SING-ZN =SYSTEM SYSTEM-TYPE = PSZ
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0
HEATING-SCHEDULE = S_ON COOLING-SCHEDULE = S_ON
HEAT-SET-T = 120.0 OA-CONTROL = FIXED
SUPPLY-CFM = 6000. RATED-CFM = 6000.
MIN-AIR-SCH = S_OA% MAX-OA-FRACTION = 0.1
FAN-SCHEDULE = S_ON SUPPLY-DELTA-T = 1.8
SUPPLY-KW = 0.00059 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY
NIGHT-VENT-DT = 0.0 COOLING-CAPACITY = 165100.
COOL-SH-CAP = 132080. COOL-FT-MIN = 0.
HEATING-CAPACITY = -120100. MIN-HP-T = 0.
MAX-HP-SUPP-T = 0. DEFROST-T = 0.
CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.
HEAT-SOURCE = HOT-WATER SIZING-OPTION = COINCIDENT
RETURN-AIR-PATH = DUCT
ZONE-NAMES = (SIMUL_AREA) ..

```

```

CRU'S =SYSTEM SYSTEM-TYPE = PSZ
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0
HEATING-SCHEDULE = S_ON COOLING-SCHEDULE = S_ON
SUPPLY-CFM = 17200. RATED-CFM = 17200.
FAN-SCHEDULE = S_OFF SUPPLY-DELTA-T = 1.8
SUPPLY-KW = 0.00059 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY
NIGHT-VENT-DT = 0.0 COOLING-CAPACITY = 322000.
COOL-SH-CAP = 322000. COOL-FT-MIN = 0.
HEATING-CAPACITY = -95600. MIN-HP-T = 0.
MAX-HP-SUPP-T = 0. DEFROST-T = 0.
CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.

```

HEAT-SOURCE = ELECTRIC SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (COMP\_AREA) ..

## \$ HOURLY REPORT DESCRIPTION

SPACE-MZ =REPORT-BLOCK VARIABLE-TYPE = ZONE\_2  
                                   VARIABLE-LIST = (17,18,7,6) ..  
 SPACE-SZ =REPORT-BLOCK VARIABLE-TYPE = SIMUL\_AREA  
                                   VARIABLE-LIST = (17,18,7,6) ..  
 SPACE-CRU =REPORT-BLOCK VARIABLE-TYPE = COMP\_AREA  
                                   VARIABLE-LIST = (17,18,7,6) ..  
 AHU-MZ =REPORT-BLOCK VARIABLE-TYPE = MZ-PERIM  
                                   VARIABLE-LIST = (3,5,6,18,19,17) ..  
 AHU-SZ =REPORT-BLOCK VARIABLE-TYPE = SING-ZN  
                                   VARIABLE-LIST = (3,5,6,17) ..  
 AHU-CRU =REPORT-BLOCK VARIABLE-TYPE = CRU'S  
                                   VARIABLE-LIST = (3,5,6,17) ..  
 ZONE-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                                   REPORT-BLOCK = (SPACE-MZ,SPACE-SZ,SPACE-CRU)  
 ..  
 AHU-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                                   REPORT-BLOCK = (AHU-MZ,AHU-SZ,AHU-CRU)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..

INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #4 NIGHT INFILTRATION FOR BLDG. #724\*  
 LINE-5 \*FLIGHT SIMULATOR \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
                  SUMMARY=(PS-B,BEPS)  
                  HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 PD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:44:17 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. #724FLIGHT SIMULATOR  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-PERIM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                            |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.524                      | 28                      | -1. F                | -2. F                | -9.897                                  | 12153.                             | 38.157                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.466                      | 2                       | 8. F                 | 6. F                 | -6.069                                  | 11024.                             | 38.157                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.493                      | 9                       | 61. F                | 45. F                | -5.483                                  | 12153.                             | 38.157                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.423                      | 2                       | 75. F                | 55. F                | -5.785                                  | 12022.                             | 38.157                          |
| MAY   | 27.35177                    | 16                      | 2                    | 62. F                | 393.774                                 | -0.203                      | 11                      | 82. F                | 62. F                | -4.460                                  | 11785.                             | 38.157                          |
| JUN   | 51.22044                    | 19                      | 15                   | 87. F                | 171.050                                 | 0.000                       |                         |                      |                      | 0.000                                   | 12022.                             | 38.157                          |
| JUL   | 59.86089                    | 16                      | 15                   | 89. F                | 181.644                                 | 0.000                       |                         |                      |                      | 0.000                                   | 12521.                             | 38.157                          |
| AUG   | 55.88170                    | 20                      | 14                   | 93. F                | 175.549                                 | 0.000                       |                         |                      |                      | 0.000                                   | 11785.                             | 38.157                          |
| SEP   | 45.78396                    | 7                       | 15                   | 92. F                | 169.524                                 | 0.000                       |                         |                      |                      | 0.000                                   | 12022.                             | 38.157                          |
| OCT   | 1.57378                     | 1                       | 15                   | 82. F                | 135.400                                 | -0.500                      | 2                       | 64. F                | 59. F                | -4.104                                  | 12153.                             | 38.157                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.419                      | 23                      | 67. F                | 55. F                | -4.960                                  | 10918.                             | 38.157                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.528                      | 15                      | 8. F                 | 7. F                 | -9.735                                  | 12521.                             | 38.157                          |
| TOTAL | 241.672                     |                         |                      |                      |   | -3.556                      |                         |                      |                      |   | 143067.                            |                                 |
| TAX   |                             |                         |                      |                      | 393.774                                 |                             |                         |                      |                      | -44.104                                 |                                    | 38.157                          |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:44:17 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. #724FLIGHT SIMULATOR  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-PERIM TOPEKA, KS

| MONTH  | N U M B E R O F          |                          |                            |                   | H O U R S                  |                            |                              |                     | C O I N C I D E N T       |                                      |  |  | L O A D S  |  |  |  |
|--------|--------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------------------|---------------------|---------------------------|--------------------------------------|--|--|--|--|--|--|
|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>FANS<br>ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0                        | 744                      | 0                          | 0                 | 744                        | 0                          | 744                          | 0                   | 0                         | 0                                    | -0.843   | 5.456  | -0.843   | 5.456  | -0.843   | 5.456  |
| FEB    | 0                        | 672                      | 0                          | 0                 | 672                        | 0                          | 672                          | 0                   | 0                         | 0                                    | -0.835   | 5.456  | -0.835   | 5.456  | -0.835   | 5.456  |
| MAR    | 0                        | 744                      | 0                          | 0                 | 744                        | 0                          | 744                          | 0                   | 0                         | 0                                    | -0.994   | 5.456  | -0.994   | 5.456  | -0.994   | 5.456  |
| APR    | 384                      | 675                      | 0                          | 45                | 720                        | 0                          | 720                          | 0                   | 0                         | 45                                   | -0.941   | 5.456  | -0.941   | 5.456  | -0.941   | 5.456  |
| MAY    | 720                      | 251                      | 0                          | 109               | 360                        | 384                        | 744                          | 0                   | 0                         | 109                                  | 0.000  | 5.456  | 0.000  | 5.456  | 0.000  | 5.456  |
| JUN    | 720                      | 0                        | 0                          | 0                 | 0                          | 720                        | 720                          | 0                   | 0                         | 0                                    | 0.000  | 38.157   | 0.000  | 38.157   | 0.000  | 38.157   |
| JUL    | 744                      | 0                        | 0                          | 0                 | 0                          | 744                        | 744                          | 0                   | 0                         | 0                                    | 0.000  | 38.157   | 0.000  | 38.157   | 0.000  | 38.157   |
| AUG    | 744                      | 0                        | 0                          | 0                 | 0                          | 744                        | 744                          | 0                   | 0                         | 0                                    | 0.000  | 38.157   | 0.000  | 38.157   | 0.000  | 38.157   |
| SEP    | 718                      | 0                        | 0                          | 2                 | 0                          | 720                        | 744                          | 0                   | 0                         | 2                                    | 0.000  | 38.157   | 0.000  | 38.157   | 0.000  | 38.157   |
| OCT    | 24                       | 610                      | 0                          | 110               | 720                        | 24                         | 744                          | 0                   | 0                         | 110                                  | 0.000  | 38.157   | 0.000  | 38.157   | 0.000  | 38.157   |
| NOV    | 0                        | 720                      | 0                          | 0                 | 720                        | 0                          | 720                          | 0                   | 0                         | 0                                    | -0.262   | 5.456  | -0.262   | 5.456  | -0.262   | 5.456  |
| DEC    | 0                        | 744                      | 0                          | 0                 | 744                        | 0                          | 744                          | 0                   | 0                         | 0                                    | -0.371   | 5.456  | -0.371   | 5.456  | -0.371   | 5.456  |
| ANNUAL | 3334                     | 5160                     | 0                          | 266               | 5424                       | 3336                       | 8760                         | 0                   | 0                         | 266                                  |  |  |  |  |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:44:17 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. #724FLIGHT SIMULATOR  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR SING-ZN TOPEKA, KS

| MONTH        | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                           |                      |         |
|--------------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|----------------------|---------|
|              | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | ELEC<br>LOAD<br>(KW) | MAXIMUM |
| JAN          | 3.26103                     | 12                      | 17                   | 43.F 35.F            | -5.649                      | 15                      | 5                    | -8.F -9.F            | -48.578                                 | 3205.                     | 5.188                |         |
| FEB          | 3.15777                     | 13                      | 17                   | 54.F 46.F            | -3.862                      | 3                       | 7                    | -5.F -6.F            | -43.269                                 | 2914.                     | 5.506                |         |
| MAR          | 4.16496                     | 27                      | 15                   | 70.F 51.F            | -2.532                      | 4                       | 5                    | 14.F 12.F            | -31.787                                 | 3298.                     | 6.232                |         |
| APR          | 6.12366                     | 27                      | 15                   | 77.F 68.F            | -0.615                      | 15                      | 7                    | 30.F 28.F            | -17.188                                 | 3452.                     | 7.824                |         |
| MAY          | 9.47406                     | 27                      | 14                   | 81.F 70.F            | -0.128                      | 1                       | 5                    | 38.F 37.F            | -12.542                                 | 3904.                     | 9.134                |         |
| JUN          | 13.35523                    | 30                      | 14                   | 88.F 76.F            | -0.001                      | 2                       | 5                    | 50.F 49.F            | -0.837                                  | 4297.                     | 10.586               |         |
| JUL          | 16.54510                    | 23                      | 15                   | 97.F 79.F            | 0.000                       |                         |                      |                      | 0.000                                   | 4776.                     | 11.954               |         |
| AUG          | 15.56999                    | 20                      | 14                   | 93.F 78.F            | 0.000                       |                         |                      |                      | 0.000                                   | 4689.                     | 11.334               |         |
| SEP          | 10.93560                    | 7                       | 15                   | 92.F 76.F            | -0.047                      | 11                      | 5                    | 41.F 40.F            | -6.758                                  | 4002.                     | 10.929               |         |
| OCT          | 7.13214                     | 1                       | 15                   | 82.F 67.F            | -0.633                      | 20                      | 5                    | 25.F 25.F            | -22.207                                 | 3637.                     | 8.694                |         |
| NOV          | 4.88792                     | 23                      | 14                   | 74.F 62.F            | -2.005                      | 3                       | 5                    | 13.F 12.F            | -31.273                                 | 3235.                     | 7.095                |         |
| DEC          | 3.44106                     | 3                       | 17                   | 52.F 44.F            | -4.286                      | 15                      | 5                    | 8.F 7.F              | -36.242                                 | 3232.                     | 5.369                |         |
| TOTAL<br>MAX | 98.048                      |                         |                      |                      | -19.757                     |                         |                      |                      | -48.578                                 | 44641.                    | 11.954               |         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:44:17 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. #724FLIGHT SIMULATOR  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR SING-ZN TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |  |                   |                            |                            |                     |                           |                           |                                      | COINCIDENT LOADS--                                 |  |  |
|--------|---------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|---------------------|---------------------------|---------------------------|--------------------------------------|--|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |
| JAN    | 480                       | 264                      | 0  | 0                 | 744                        | 744                        | 744                 | 0                         | 0                         | 0                                    | 0.000  | 4.196  |  |
| FEB    | 443                       | 229                      | 0  | 0                 | 672                        | 672                        | 744                 | 0                         | 0                         | 0                                    | 0.000  | 4.361  |  |
| MAR    | 539                       | 205                      | 0  | 0                 | 744                        | 744                        | 744                 | 0                         | 0                         | 0                                    | 0.000  | 6.232  |  |
| APR    | 632                       | 88                       | 0  | 0                 | 720                        | 720                        | 720                 | 0                         | 0                         | 0                                    | 0.000  | 7.824  |  |
| MAY    | 720                       | 24                       | 0  | 0                 | 744                        | 744                        | 744                 | 0                         | 0                         | 0                                    | 0.000  | 9.134  |  |
| JUN    | 719                       | 1                        | 0  | 0                 | 720                        | 720                        | 720                 | 0                         | 0                         | 0                                    | 0.000  | 10.586   |  |
| JUL    | 744                       | 0                        | 0  | 0                 | 744                        | 744                        | 744                 | 0                         | 0                         | 0                                    | 0.000  | 11.954   |  |
| AUG    | 744                       | 0                        | 0  | 0                 | 744                        | 744                        | 744                 | 0                         | 0                         | 0                                    | 0.000  | 11.288   |  |
| SEP    | 696                       | 24                       | 0  | 0                 | 720                        | 720                        | 720                 | 0                         | 0                         | 0                                    | 0.000  | 10.929   |  |
| OCT    | 645                       | 99                       | 0  | 0                 | 744                        | 744                        | 744                 | 0                         | 0                         | 0                                    | 0.000  | 8.694  |  |
| NOV    | 550                       | 170                      | 0  | 0                 | 720                        | 720                        | 720                 | 0                         | 0                         | 0                                    | 0.000  | 7.095  |  |
| DEC    | 483                       | 261                      | 0  | 0                 | 744                        | 744                        | 744                 | 0                         | 0                         | 0                                    | 0.000  | 4.329  |  |
| ANNUAL | 7395                      | 1365                     | 0  | 0                 | 8760                       | 8760                       | 8760                | 0                         | 0                         | 0                                    |  |  |  |



| EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:44:17 SDL RUN 1 |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
|--|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. #724FLIGHT SIMULATOR                            |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR CRU'S TOPEKA, KS                                       |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----  |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                                    |                                 |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN  | 100.38735                   | 15                      | 11                   | -1.F                 | -2.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 35818.                             | 59.700                          |
| FEB  | 90.95567                    | 3                       | 10                   | 10.F                 | 8.F                                     | 0.000                       |                         |                      |                      | 0.000                                   | 32679.                             | 61.377                          |
| MAR  | 101.75665                   | 3                       | 7                    | 14.F                 | 12.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 36961.                             | 64.123                          |
| APR  | 99.73093                    | 28                      | 15                   | 74.F                 | 67.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 37284.                             | 66.665                          |
| MAY  | 104.52082                   | 16                      | 3                    | 61.F                 | 59.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 39554.                             | 68.457                          |
| JUN  | 102.29000                   | 16                      | 11                   | 66.F                 | 63.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 39226.                             | 66.515                          |
| JUL  | 106.57320                   | 30                      | 6                    | 63.F                 | 60.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 41040.                             | 67.627                          |
| AUG  | 106.44633                   | 4                       | 15                   | 92.F                 | 69.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 41181.                             | 71.045                          |
| SEP  | 101.72897                   | 15                      | 6                    | 46.F                 | 45.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 38578.                             | 68.542                          |
| OCT  | 103.31563                   | 14                      | 13                   | 71.F                 | 64.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 38648.                             | 67.038                          |
| NOV  | 98.70152                    | 3                       | 7                    | 19.F                 | 17.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 36072.                             | 64.627                          |
| DEC  | 101.00494                   | 14                      | 7                    | 10.F                 | 8.F                                     | 0.000                       |                         |                      |                      | 0.000                                   | 36148.                             | 61.436                          |
| TOTAL  | 1217.413                    |                         |                      |                      |   | 0.000                       |                         |                      |                      | 0.000                                   | 453192.                            | 71.045                          |
| MAX  |                             |                         |                      |                      | 246.669                                 |                             |                         |                      |                      |   |                                    |                                 |

| EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:44:17 SDL RUN 1 |                          |                          |  |                   |                            |                            |                  |                           |                           |                                      |  |  |
|--|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------|---------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. #724FLIGHT SIMULATOR                            |                          |                          |  |                   |                            |                            |                  |                           |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR CRU'S TOPEKA, KS  |                          |                          |  |                   |                            |                            |                  |                           |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----  |                          |                          |  |                   |                            |                            |                  |                           |                           |                                      |  |  |
| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON | HOURS<br>FANS<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN  | 530                      | 0                        | 0  | 214               | 744                        | 744                        | 530              | 530                       | 0                         | 0                                    | 0.000  | 54.234   |
| FEB  | 483                      | 0                        | 0  | 189               | 672                        | 672                        | 483              | 483                       | 0                         | 0                                    | 0.000  | 54.921   |
| MAR  | 546                      | 0                        | 0  | 198               | 744                        | 744                        | 546              | 546                       | 0                         | 0                                    | 0.000  | 55.087   |
| APR  | 538                      | 0                        | 0  | 182               | 720                        | 720                        | 538              | 538                       | 0                         | 0                                    | 0.000  | 66.665   |
| MAY  | 564                      | 0                        | 0  | 180               | 744                        | 744                        | 564              | 564                       | 0                         | 0                                    | 0.000  | 62.090   |
| JUN  | 564                      | 0                        | 0  | 156               | 720                        | 720                        | 564              | 564                       | 0                         | 0                                    | 0.000  | 63.713   |
| JUL  | 595                      | 0                        | 0  | 149               | 744                        | 744                        | 595              | 595                       | 0                         | 0                                    | 0.000  | 62.725   |
| AUG  | 590                      | 0                        | 0  | 154               | 744                        | 744                        | 590              | 590                       | 0                         | 0                                    | 0.000  | 70.934   |
| SEP  | 555                      | 0                        | 0  | 165               | 720                        | 720                        | 555              | 555                       | 0                         | 0                                    | 0.000  | 59.750   |
| OCT  | 554                      | 0                        | 0  | 190               | 744                        | 744                        | 554              | 554                       | 0                         | 0                                    | 0.000  | 66.094   |
| NOV  | 529                      | 0                        | 0  | 191               | 720                        | 720                        | 529              | 529                       | 0                         | 0                                    | 0.000  | 55.769   |
| DEC  | 537                      | 0                        | 0  | 207               | 744                        | 744                        | 537              | 537                       | 0                         | 0                                    | 0.000  | 54.877   |
| ANNUAL   | 6585                     | 0                        | 0  | 2175              | 8760                       | 8760                       | 6585             | 6585                      | 0                         | 0                                    |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:44:17 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. #724FLIGHT SIMULATOR  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|-----|--|---|---|
| JAN | 352.024<br>159.675<br>9/14                       | 175.305<br>352.024<br>9/14                          | 9.161<br>68.122<br>15/ 5                            |
| FEB | 358.654<br>26/13                                 | 159.675<br>358.654<br>26/13                         | 6.792<br>59.102<br>3/ 5                             |
| MAR | 366.159<br>27/15                                 | 179.418<br>366.159<br>27/15                         | 4.970<br>46.772<br>4/ 5                             |
| APR | 383.538<br>28/15                                 | 180.456<br>383.538<br>28/15                         | 1.968<br>28.587<br>15/ 5                            |
| MAY | 443.831<br>21/15                                 | 198.847<br>443.831<br>21/15                         | 0.646<br>25.426<br>1/ 5                             |
| JUN | 450.826<br>29/15                                 | 209.228<br>450.826<br>29/15                         | 0.002<br>1.788<br>2/ 5                              |
| JUL | 463.217<br>23/13                                 | 221.847<br>463.217<br>23/13                         | 0.000<br>31/ 1<br>0.000                             |
| AUG | 467.201<br>12/15                                 | 218.895<br>467.201<br>12/15                         | 0.000<br>31/ 1<br>0.087                             |
| SEP | 458.564<br>7/15                                  | 204.078<br>458.564<br>7/15                          | 11.463<br>11/ 5<br>2.061                            |
| OCT | 432.472<br>1/14                                  | 186.781<br>432.472<br>1/14                          | 58.753<br>2/ 2<br>4.064                             |
| NOV | 375.199<br>23/13                                 | 171.908<br>375.199<br>23/13                         | 47.556<br>3/ 5<br>7.488                             |
| DEC | 358.725<br>28/15                                 | 177.757<br>358.725<br>28/15                         | 59.341<br>15/ 5<br>37.240                           |
|     | ONE YEAR<br>USE/PEAK                             | 2284.195<br>467.201                                 | 68.122  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:44:17 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. #724 FLIGHT SIMULATOR  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 1.59        | 37.24       |
| SPACE COOL                                       | 423.15      | 0.00        |
| HVAC AUX   | 506.15      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 160.53      | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 1192.66     | 0.00        |
| TOTAL  | 2284.08     | 37.24       |

TOTAL SITE ENERGY 2321.44 MBTU 177.2 KBTU/SQFT-YR GROSS-AREA 221.0 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 6896.69 MBTU 526.5 KBTU/SQFT-YR GROSS-AREA 656.5 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 46.7  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

AZIMUTH = 225 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 2.5 WIDTH = 43.2 CONS = ROOF/WAL  
AZIMUTH = 135 SKY-FORM-FACTOR = 1.0 ..

E-W HEIGHT = 2.5 WIDTH = 43.2 CONS = ROOF/WAL  
AZIMUTH = 315 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 14.4 WIDTH = 36.8 CONS = ROOF-1  
AZIMUTH = 135 TILT = 40 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 18.0 WIDTH = 46.0 CONS = ROOF-1  
AZIMUTH = 315 TILT = 40 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
\$ E Z - D O E S Y S T E M S I N P U T \$  
\$-----\$

#### \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #5 DAY INFILTRATION FOR BLDG. #724 \*  
LINE-5 \*FLIGHT SIMULATOR \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
SYSTEMS-REPORT VERIFICATION=(SV-A)  
SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
HOURLY-DATA-SAVE = YES ..

#### \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
SD\_WT\_HT\_W =DAY-SCHEDULE (1,24) (74.) ..  
SD\_SM\_CL\_W =DAY-SCHEDULE (1,24) (72.) ..  
SD\_WT\_CL\_W =DAY-SCHEDULE (1,24) (76.) ..  
SD\_SM\_HT\_W =DAY-SCHEDULE (1,24) (70.) ..  
SD\_WT\_HT\_D =DAY-SCHEDULE (1,24) (55.) ..  
SD\_SM\_CL\_D =DAY-SCHEDULE (1,24) (85.) ..  
SD\_WT\_CL\_D =DAY-SCHEDULE (1,24) (57.) ..  
SD\_SM\_HT\_D =DAY-SCHEDULE (1,24) (83.) ..  
SD\_FAN\_WK =DAY-SCHEDULE (1,4) (0.)  
(5,16) (1.)

```

(17,24) (0.) ..
SD_FAN_END =DAY-SCHEDULE (1,24) (0.) ..
SD_WTHT_CR =DAY-SCHEDULE (1,24) (74.) ..
SD_SMCL_CR =DAY-SCHEDULE (1,24) (72.) ..
SD_WTCL_CR =DAY-SCHEDULE (1,24) (76.) ..
SD_SMHT_CR =DAY-SCHEDULE (1,24) (70.) ..
SD_OA%      =DAY-SCHEDULE (1,4) (0.1)
                (5,16) (0.)
                (17,24) (0.1) ..
SD_OA%_END =DAY-SCHEDULE (1,24) (0.1) ..

SW_ON       =WEEK-SCHEDULE (ALL) SD_ON ..

SW_OFF      =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT    =WEEK-SCHEDULE (ALL) SD_WT_HT_W ..

SW_SM_CL    =WEEK-SCHEDULE (ALL) SD_SM_CL_W ..

SW_WT_CL    =WEEK-SCHEDULE (ALL) SD_WT_CL_W ..

SW_SM_HT    =WEEK-SCHEDULE (ALL) SD_SM_HT_W ..

SW_FAN_CYC  =WEEK-SCHEDULE (MON) SD_FAN_END
                (TUE) SD_FAN_END
                (WED) SD_FAN_WK
                (THU) SD_FAN_WK
                (FRI) SD_FAN_WK
                (SAT) SD_FAN_WK
                (SUN) SD_FAN_WK
                (HOL) SD_FAN_END ..

SW_WTHT_CR  =WEEK-SCHEDULE (ALL) SD_WTHT_CR ..

SW_SMCL_CR  =WEEK-SCHEDULE (ALL) SD_SMCL_CR ..

SW_WTCL_CR  =WEEK-SCHEDULE (ALL) SD_WTCL_CR ..

SW_SMHT_CR  =WEEK-SCHEDULE (ALL) SD_SMHT_CR ..

SW_OA%      =WEEK-SCHEDULE (MON) SD_OA%_END
                (TUE) SD_OA%_END
                (WED) SD_OA%
                (THU) SD_OA%
                (FRI) SD_OA%
                (SAT) SD_OA%
                (SUN) SD_OA%
                (HOL) SD_OA%_END ..

```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..
```

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET =SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

S\_HRLY-RPT =SCHEDULE THRU JAN 3 SW\_OFF  
 THRU JAN 5 SW\_ON  
 THRU AUG 13 SW\_OFF  
 THRU AUG 15 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

## \$ HEATING SET TEMP

S\_HT\_SETCR =SCHEDULE THRU MAY 15 SW\_WTHT\_CR  
 THRU OCT 1 SW\_SMHT\_CR  
 THRU DEC 31 SW\_WTHT\_CR ..

## \$ COOLING SET TEMP

S\_CL\_SETCR =SCHEDULE THRU MAY 15 SW\_WTCL\_CR  
 THRU OCT 1 SW\_SMCL\_CR  
 THRU DEC 31 SW\_WTCL\_CR ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

## \$ ZONE DESCRIPTION


ZONE\_2 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..


ZONE\_1 =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

COMP\_AREA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SETCR COOL-TEMP-SCH = S\_CL\_SETCR  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

SIMUL\_AREA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET COOL-TEMP-SCH = S\_CL\_SET  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ-PERIM =SYSTEM SYSTEM-TYPE = MZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 OA-CONTROL = FIXED SUPPLY-CFM = 6200.  
 RATED-CFM = 6200. MIN-AIR-SCH = S\_OA%   
 MAX-OA-FRACTION = 0.1 FAN-SCHEDULE = S\_ON  
 SUPPLY-DELTA-T = 2.7 SUPPLY-KW = 0.00088  
 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 190200.  
 COOL-SH-CAP = 152160. HEATING-CAPACITY = -146100.  
 SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (ZONE\_1, ZONE\_2) ..

SING-ZN =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_ON COOLING-SCHEDULE = S\_ON  
 HEAT-SET-T = 120.0 OA-CONTROL = FIXED  
 SUPPLY-CFM = 6000. RATED-CFM = 6000.  
 MIN-AIR-SCH = S\_OA% MAX-OA-FRACTION = 0.1   
 FAN-SCHEDULE = S\_ON SUPPLY-DELTA-T = 1.8  
 SUPPLY-KW = 0.00059 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  
 NIGHT-VENT-DT = 0.0 COOLING-CAPACITY = 165100.  
 COOL-SH-CAP = 132080. COOL-FT-MIN = 0.  
 HEATING-CAPACITY = -120100. MIN-HP-T = 0.  
 MAX-HP-SUPP-T = 0. DEFROST-T = 0.  
 CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = HOT-WATER SIZING-OPTION = COINCIDENT  
 RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (SIMUL\_AREA) ..

CRU'S =SYSTEM SYSTEM-TYPE = PSZ  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_ON COOLING-SCHEDULE = S\_ON  
 SUPPLY-CFM = 17200. RATED-CFM = 17200.  
 FAN-SCHEDULE = S\_OFF SUPPLY-DELTA-T = 1.8  
 SUPPLY-KW = 0.00059 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  
 NIGHT-VENT-DT = 0.0 COOLING-CAPACITY = 322000.  
 COOL-SH-CAP = 322000. COOL-FT-MIN = 0.  
 HEATING-CAPACITY = -95600. MIN-HP-T = 0.  
 MAX-HP-SUPP-T = 0. DEFROST-T = 0.

CRANKCASE-MAX-T = 0. OUTSIDE-FAN-T = 45.  
 HEAT-SOURCE = ELECTRIC SIZING-OPTION = COINCIDENT  
 ZONE-NAMES = (COMP\_AREA) ..

## \$ HOURLY REPORT DESCRIPTION

SPACE-MZ =REPORT-BLOCK VARIABLE-TYPE = ZONE\_2  
           VARIABLE-LIST = (17,18,7,6) ..  
 SPACE-SZ =REPORT-BLOCK VARIABLE-TYPE = SIMUL\_AREA  
           VARIABLE-LIST = (17,18,7,6) ..  
 SPACE-CRU =REPORT-BLOCK VARIABLE-TYPE = COMP\_AREA  
           VARIABLE-LIST = (17,18,7,6) ..  
 AHU-MZ =REPORT-BLOCK VARIABLE-TYPE = MZ-PERIM  
           VARIABLE-LIST = (3,5,6,18,19,17) ..  
 AHU-SZ =REPORT-BLOCK VARIABLE-TYPE = SING-ZN  
           VARIABLE-LIST = (3,5,6,17) ..  
 AHU-CRU =REPORT-BLOCK VARIABLE-TYPE = CRU'S  
           VARIABLE-LIST = (3,5,6,17) ..  
 ZONE-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
           REPORT-BLOCK = (SPACE-MZ,SPACE-SZ,SPACE-CRU)  
 ..  
 AHU-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
           REPORT-BLOCK = (AHU-MZ,AHU-SZ,AHU-CRU)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..

INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #5 DAY INFILTRATION FOR BLDG. #724 \*  
 LINE-5 \*FLIGHT SIMULATOR \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
               SUMMARY=(PS-B,BEPS)  
               HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 PD\_OFF =DAY-SCHEDULE (1,24) (0.) ..



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:53: 0 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. #724 FLIGHT SIMULATOR  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-PERIM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |   |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | MAXIMUM<br>ELEC-<br>TRICAL<br>ENERGY<br>(KWH) |
| JAN   | 0.00000                     |                         |                      |                      | -4.705                      | 5                       | 4                    | 0. F                 | -69.555                                 | 12153.  |
| FEB   | 0.00000                     |                         |                      |                      | -3.509                      | 2                       | 4                    | 10. F                | -66.566                                 | 11024.  |
| MAR   | 0.00000                     |                         |                      |                      | -1.556                      | 2                       | 4                    | 25. F                | -37.375                                 | 12153.  |
| APR   | 0.00000                     |                         |                      |                      | -0.923                      | 3                       | 17                   | 49. F                | -16.158                                 | 12022.  |
| MAY   | 27.76151                    | 16                      | 2                    | 62. F                | -0.479                      | 4                       | 17                   | 55. F                | -16.650                                 | 11785.  |
| JUN   | 54.07588                    | 19                      | 15                   | 87. F                | 0.000                       |                         |                      |                      | 0.000                                   | 12022.  |
| JUL   | 62.55460                    | 23                      | 17                   | 97. F                | 0.000                       |                         |                      |                      | 0.000                                   | 11785.  |
| AUG   | 59.68844                    | 24                      | 17                   | 95. F                | 0.000                       |                         |                      |                      | 0.000                                   | 12022.  |
| SEP   | 47.71723                    | 7                       | 15                   | 92. F                | -1.041                      | 2                       | 2                    | 64. F                | -47.653                                 | 12153.  |
| OCT   | 1.69185                     | 1                       | 15                   | 82. F                | -0.962                      | 19                      | 17                   | 45. F                | -17.355                                 | 10918.  |
| NOV   | 0.00000                     |                         |                      |                      | -4.260                      | 14                      | 4                    | 14. F                | -65.360                                 | 12521.  |
| DEC   | 0.00000                     |                         |                      |                      | -17.434                     |                         |                      |                      |   |   |
| TOTAL | 253.489                     |                         |                      |                      |                             |                         |                      |                      | -69.555                                 | 143067.                                       |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   | 38.157  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:53: 0 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. #724 FLIGHT SIMULATOR  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-PERIM TOPEKA, KS

| MONTH  | H O U R S       |                 |          |                   | H O U R S         |         |                   |         | C O I N C I D E N T |         |                   |         | C O I N C I D E N T |         |                   |         |
|--------|-----------------|-----------------|----------|-------------------|-------------------|---------|-------------------|---------|---------------------|---------|-------------------|---------|---------------------|---------|-------------------|---------|
|        | COOLING<br>LOAD | HEATING<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | COOLING<br>AVAIL. | FANS ON | COOLING<br>AVAIL.   | FANS ON | COOLING<br>AVAIL. | FANS ON | COOLING<br>AVAIL.   | FANS ON | COOLING<br>AVAIL. | FANS ON |
| JAN    | 0               | 744             | 0        | 744               | 0                 | 744     | 0                 | 744     | 0                   | 744     | 0                 | 744     | 0                   | 744     | 0                 | 744     |
| FEB    | 0               | 672             | 0        | 672               | 0                 | 672     | 0                 | 672     | 0                   | 672     | 0                 | 672     | 0                   | 672     | 0                 | 672     |
| MAR    | 0               | 744             | 0        | 744               | 0                 | 744     | 0                 | 744     | 0                   | 744     | 0                 | 744     | 0                   | 744     | 0                 | 744     |
| APR    | 0               | 663             | 57       | 720               | 0                 | 720     | 0                 | 720     | 0                   | 720     | 0                 | 720     | 0                   | 720     | 0                 | 720     |
| MAY    | 384             | 276             | 84       | 360               | 384               | 744     | 384               | 744     | 384                 | 744     | 384               | 744     | 384                 | 744     | 384               | 744     |
| JUN    | 720             | 0               | 0        | 0                 | 720               | 744     | 720               | 744     | 720                 | 744     | 720               | 744     | 720                 | 744     | 720               | 744     |
| JUL    | 744             | 0               | 0        | 0                 | 744               | 744     | 744               | 744     | 744                 | 744     | 744               | 744     | 744                 | 744     | 744               | 744     |
| AUG    | 744             | 0               | 0        | 0                 | 744               | 744     | 744               | 744     | 744                 | 744     | 744               | 744     | 744                 | 744     | 744               | 744     |
| SEP    | 716             | 0               | 4        | 0                 | 720               | 744     | 720               | 744     | 720                 | 744     | 720               | 744     | 720                 | 744     | 720               | 744     |
| OCT    | 24              | 616             | 104      | 720               | 24                | 744     | 24                | 744     | 24                  | 744     | 24                | 744     | 24                  | 744     | 24                | 744     |
| NOV    | 0               | 719             | 1        | 720               | 0                 | 720     | 0                 | 720     | 0                   | 720     | 0                 | 720     | 0                   | 720     | 0                 | 720     |
| DEC    | 0               | 744             | 0        | 744               | 0                 | 744     | 0                 | 744     | 0                   | 744     | 0                 | 744     | 0                   | 744     | 0                 | 744     |
| ANNUAL | 3332            | 5178            | 250      | 5424              | 3336              | 8760    | 3336              | 8760    | 3336                | 8760    | 3336              | 8760    | 3336                | 8760    | 3336              | 8760    |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:53: 0 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. #724 FLIGHT SIMULATOR  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR SING-ZN TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                            |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|----------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL-<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 2.75553                     | 12 15                   | 52.5 F               | 42.5 F               | -11.737                     | 15 4                    | -8.5 F               | -9.5 F               | -51.299                                 | 3175.                      | 6.144                           |
| FEB   | 2.66934                     | 24 15                   | 52.5 F               | 45.5 F               | -8.895                      | 3 4                     | 0.5 F                | -1.5 F               | -44.420                                 | 2888.                      | 6.311                           |
| MAR   | 3.31709                     | 18 12                   | 58.5 F               | 52.5 F               | -7.147                      | 4 4                     | 14.5 F               | 12.5 F               | -34.187                                 | 3247.                      | 6.561                           |
| APR   | 5.34210                     | 27 17                   | 75.5 F               | 67.5 F               | -2.044                      | 5 7                     | 30.5 F               | 27.5 F               | -22.475                                 | 3394.                      | 7.090                           |
| MAY   | 9.92895                     | 31 18                   | 90.5 F               | 76.5 F               | -0.347                      | 1 4                     | 39.5 F               | 37.5 F               | -13.826                                 | 3964.                      | 8.583                           |
| JUN   | 16.07705                    | 19 17                   | 87.5 F               | 76.5 F               | -0.006                      | 2 4                     | 50.5 F               | 49.5 F               | -2.828                                  | 4593.                      | 8.616                           |
| JUL   | 19.35152                    | 23 17                   | 97.5 F               | 79.5 F               | 0.000                       |                         |                      |                      | 0.000                                   | 5079.                      | 10.111                          |
| AUG   | 19.49169                    | 24 17                   | 95.5 F               | 77.5 F               | 0.000                       |                         |                      |                      | 0.000                                   | 5134.                      | 9.526                           |
| SEP   | 12.23977                    | 7 17                    | 92.5 F               | 75.5 F               | -0.219                      | 12 7                    | 42.5 F               | 42.5 F               | -9.002                                  | 4154.                      | 8.907                           |
| OCT   | 6.18177                     | 1 17                    | 85.5 F               | 68.5 F               | -1.533                      | 20 4                    | 25.5 F               | 25.5 F               | -24.443                                 | 3565.                      | 7.372                           |
| NOV   | 3.45482                     | 23 15                   | 74.5 F               | 61.5 F               | -5.593                      | 3 4                     | 13.5 F               | 12.5 F               | -33.737                                 | 3133.                      | 7.022                           |
| DEC   | 3.13769                     | 3 15                    | 54.5 F               | 45.5 F               | -10.643                     | 13 8                    | 0.5 F                | -1.5 F               | -45.196                                 | 3225.                      | 6.253                           |
| TOTAL | 103.947                     |                         |                      |                      | -48.163                     |                         |                      |                      | -51.299                                 | 45549.                     | 10.111                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                            |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:53: 0 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. #724 FLIGHT SIMULATOR  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR SING-ZN TOPEKA, KS

| MONTH | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | 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HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | 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EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:53: 0 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. #724 FLIGHT SIMULATOR  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR CRU'S TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                           |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 100.38735                   | 15                      | 11                   | -1.F                 | 246.669                                 | 0.000                       |                         |                      |                      | 0.000                                   | 35818.                    | 59.700                          |
| FEB   | 90.95567                    | 3                       | 10                   | 10.F                 | 241.575                                 | 0.000                       |                         |                      |                      | 0.000                                   | 32679.                    | 61.377                          |
| MAR   | 101.75665                   | 3                       | 7                    | 14.F                 | 235.055                                 | 0.000                       |                         |                      |                      | 0.000                                   | 36961.                    | 64.123                          |
| APR   | 99.73093                    | 28                      | 15                   | 74.F                 | 240.717                                 | 0.000                       |                         |                      |                      | 0.000                                   | 37284.                    | 66.665                          |
| MAY   | 104.52082                   | 16                      | 3                    | 61.F                 | 240.751                                 | 0.000                       |                         |                      |                      | 0.000                                   | 39554.                    | 68.457                          |
| JUN   | 102.29000                   | 16                      | 11                   | 66.F                 | 223.435                                 | 0.000                       |                         |                      |                      | 0.000                                   | 39226.                    | 66.515                          |
| JUL   | 106.57320                   | 30                      | 6                    | 63.F                 | 218.749                                 | 0.000                       |                         |                      |                      | 0.000                                   | 41040.                    | 67.627                          |
| AUG   | 106.44633                   | 4                       | 15                   | 92.F                 | 232.520                                 | 0.000                       |                         |                      |                      | 0.000                                   | 41181.                    | 71.045                          |
| SEP   | 101.72897                   | 15                      | 6                    | 46.F                 | 225.422                                 | 0.000                       |                         |                      |                      | 0.000                                   | 38578.                    | 68.542                          |
| OCT   | 103.31563                   | 14                      | 13                   | 71.F                 | 239.604                                 | 0.000                       |                         |                      |                      | 0.000                                   | 38648.                    | 67.038                          |
| NOV   | 98.70152                    | 3                       | 7                    | 19.F                 | 236.852                                 | 0.000                       |                         |                      |                      | 0.000                                   | 36072.                    | 64.627                          |
| DEC   | 101.00494                   | 14                      | 7                    | 10.F                 | 240.516                                 | 0.000                       |                         |                      |                      | 0.000                                   | 36148.                    | 61.436                          |
| TOTAL | 1217.413                    |                         |                      |                      |   | 0.000                       |                         |                      |                      |   | 453192.                   |                                 |
| MAX   |                             |                         |                      |                      | 246.669                                 |                             |                         |                      |                      | 0.000                                   |                           | 71.045                          |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:53: 0 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. #724 FLIGHT SIMULATOR  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR CRU'S TOPEKA, KS

| MONTH  | N U M B E R O F          |                          |                            |                   | H O U R S                  |                            |                           |                     | C O I N C I D E N T       |                                      |  |  | L O A D S  |  |  |  |
|--------|--------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|---------------------------|---------------------|---------------------------|--------------------------------------|--|--|--|--|--|--|
|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE | HOURS<br>FANS<br>ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 530                      | 0                        | 0                          | 214               | 744                        | 744                        | 530                       | 530                 | 0                         | 0                                    | 0.000  | 54.234   | 0.000  | 54.234   | 0.000  | 54.234   |
| FEB    | 483                      | 0                        | 0                          | 189               | 672                        | 672                        | 483                       | 483                 | 0                         | 0                                    | 0.000  | 54.921   | 0.000  | 54.921   | 0.000  | 54.921   |
| MAR    | 546                      | 0                        | 0                          | 198               | 744                        | 744                        | 546                       | 546                 | 0                         | 0                                    | 0.000  | 55.087   | 0.000  | 55.087   | 0.000  | 55.087   |
| APR    | 538                      | 0                        | 0                          | 182               | 720                        | 720                        | 538                       | 538                 | 0                         | 0                                    | 0.000  | 66.665   | 0.000  | 66.665   | 0.000  | 66.665   |
| MAY    | 564                      | 0                        | 0                          | 180               | 744                        | 744                        | 564                       | 564                 | 0                         | 0                                    | 0.000  | 62.090   | 0.000  | 62.090   | 0.000  | 62.090   |
| JUN    | 564                      | 0                        | 0                          | 156               | 720                        | 720                        | 564                       | 564                 | 0                         | 0                                    | 0.000  | 63.713   | 0.000  | 63.713   | 0.000  | 63.713   |
| JUL    | 595                      | 0                        | 0                          | 149               | 744                        | 744                        | 595                       | 595                 | 0                         | 0                                    | 0.000  | 62.725   | 0.000  | 62.725   | 0.000  | 62.725   |
| AUG    | 590                      | 0                        | 0                          | 154               | 744                        | 744                        | 590                       | 590                 | 0                         | 0                                    | 0.000  | 70.934   | 0.000  | 70.934   | 0.000  | 70.934   |
| SEP    | 555                      | 0                        | 0                          | 165               | 720                        | 720                        | 555                       | 555                 | 0                         | 0                                    | 0.000  | 59.750   | 0.000  | 59.750   | 0.000  | 59.750   |
| OCT    | 554                      | 0                        | 0                          | 190               | 744                        | 744                        | 554                       | 554                 | 0                         | 0                                    | 0.000  | 66.094   | 0.000  | 66.094   | 0.000  | 66.094   |
| NOV    | 529                      | 0                        | 0                          | 191               | 720                        | 720                        | 529                       | 529                 | 0                         | 0                                    | 0.000  | 55.769   | 0.000  | 55.769   | 0.000  | 55.769   |
| DEC    | 537                      | 0                        | 0                          | 207               | 744                        | 744                        | 537                       | 537                 | 0                         | 0                                    | 0.000  | 54.877   | 0.000  | 54.877   | 0.000  | 54.877   |
| ANNUAL | 6585                     | 0                        | 0                          | 2175              | 8760                       | 8760                       | 6585                      | 6585                | 0                         | 0                                    |  |  |  |  |  |  |

EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:53: 0 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #5 DAY INFILTRATION FOR BLDG. #724 FLIGHT SIMULATOR  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>176.191<br>355.618<br>9/14<br>160.430<br>361.917<br>26/13<br>180.025<br>368.052<br>9/14<br>180.678<br>381.870<br>28/15<br>198.745<br>433.701<br>21/15<br>209.839<br>431.874<br>29/15<br>222.305<br>439.628<br>22/15<br>220.222<br>448.766<br>4/15<br>204.083<br>437.576<br>7/15<br>186.880<br>423.429<br>1/14<br>172.226<br>375.416<br>23/13<br>178.672<br>362.124<br>28/15 | NATURAL-GAS<br>25.236<br>144.009<br>5/ 4<br>19.659<br>132.458<br>2/ 4<br>14.602<br>88.517<br>16/ 4<br>5.439<br>40.235<br>5/ 7<br>1.596<br>29.360<br>4/17<br>0.013<br>5.509<br>2/ 4<br>0.000<br>31/ 1<br>0.000<br>31/ 1<br>0.421<br>15.599<br>12/ 7<br>4.725<br>78.164<br>2/ 2<br>11.306<br>56.835<br>30/17<br>23.058<br>134.076<br>13/ 8 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 176.191<br>355.618<br>9/14   | 25.236<br>144.009<br>5/ 4  |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 160.430<br>361.917<br>26/13  | 19.659<br>132.458<br>2/ 4  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 180.025<br>368.052<br>9/14   | 14.602<br>88.517<br>16/ 4  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 180.678<br>381.870<br>28/15  | 5.439<br>40.235<br>5/ 7  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 198.745<br>433.701<br>21/15  | 1.596<br>29.360<br>4/17  |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 209.839<br>431.874<br>29/15  | 0.013<br>5.509<br>2/ 4   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 222.305<br>439.628<br>22/15  | 0.000<br>31/ 1<br>0.000  |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 220.222<br>448.766<br>4/15   | 0.000<br>31/ 1<br>0.421  |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 204.083<br>437.576<br>7/15   | 15.599<br>12/ 7<br>4.725   |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 186.880<br>423.429<br>1/14   | 78.164<br>2/ 2<br>11.306   |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 172.226<br>375.416<br>23/13  | 56.835<br>30/17<br>23.058  |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 178.672<br>362.124<br>28/15  | 134.076<br>13/ 8   |
|     | ONE YEAR<br>USE/PEAK                             | 2290.294<br>448.766  | 106.056<br>144.009   |

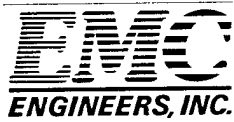
EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/15/1995 10:53: 0 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. #724 FLIGHT SIMULATOR  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 4.94        | 106.06      |
| SPACE COOL      | 425.31      | 0.00        |
| HVAC AUX        | 506.74      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 160.53      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 1192.66     | 0.00        |
| TOTAL           | 2290.18     | 106.06      |

TOTAL SITE ENERGY 2396.35 MBTU 182.9 KBTU/SQFT-YR GROSS-AREA 228.1 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 6983.81 MBTU 533.1 KBTU/SQFT-YR GROSS-AREA 664.7 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 46.7  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

**COMPUTER ENERGY SIMULATIONS**

**BLDG. 7485  
BOWLING ALLEY**



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

BUILDING NO.: 7485  
BLDG. TYPE: BOWLING ALLEY

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

### ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3    | RUN4    | RUN5    |
|----------------|---------|---------|---------|---------|---------|---------|
| HEATING (MBtu) | 1369.9  | 957.6   | 940.5   | 1022.0  | 999.7   | 585.8   |
| COOLING (kWH)  | 654,550 | 571,465 | 631,975 | 567,047 | 650,369 | 630,161 |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 27,040 CFM                        |
| FLOOR AREA     | 34,916 FT <sup>2</sup>            |
| CFMI           | 5408 CFM                          |
| UA             | 7107 BTU/HR-°F                    |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

#### EZDOE COMPUTER RUN DEFINITION:

| BASERUN | EXISTING OPERATION          |
|---------|-----------------------------|
| RUN1    | NIGHT SETBACK               |
| RUN2    | DDC CONTROL                 |
| RUN3    | ECONOMIZER                  |
| RUN4    | NIGHTTIME INFILTRATION (OA) |
| RUN5    | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      |            | ANNUAL HEATING & COOLING HOURS |            |
|--------------------|-------------------|------|------------|--------------------------------|------------|
| M-F                | 800               | 2400 | 80 HR      | HR. ON HEATING                 | 3535 HR/YR |
| SAT.               | 600               | 2400 | 18 HR      | HR. ON COOLING                 | 2149 HR/YR |
| SUN.               | 1100              | 2200 | 11 HR      | HR. OFF HEATING                | 1913 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 109 HR/WK  | HR. OFF COOLING                | 1163 HR/YR |
|                    | TOTAL UNOCC. HR.  |      | 59 HR/WK   |                                |            |
|                    | ANNUAL OCCUPY HR. |      | 5684 HR/YR |                                |            |
|                    | ANNUAL UNOCC. HR. |      | 3076 HR/YR |                                |            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

8760 HR/YR  
5448 HR/YR  
3312 HR/YR

HRS SAVED (HTG ONLY) 5448 - 3535 = 1913 HR/YR  
HRS SAVED (CLG ONLY) 3312 - 2149 = 1163 HR/YR

|           |   |   |               |   |                     |
|-----------|---|---|---------------|---|---------------------|
| HOAUHC    | 1369.91 MBtu  | - | 999.7 MBtu    | = | 2.23E+01 Btu/CFM-HR |
|           | 5408 CFM  | x | 3076 HR/YR    |   |                     |
| HOAUH     | 1369.91 MBtu  | - | 999.7 MBtu    | = | 3.58E+01 Btu/CFM-HR |
|           | 5408 CFM  | x | 1913 HR/YR    |   |                     |
| COAUHC    | 654,550.2 kWH   | - | 650,369.2 kWH | = | 2.51E-04 kWH/CFM-HR |
|           | 5408 CFM  | x | 3076 HR/YR    |   |                     |
| COAUC     | 654,550.2 kWH   | - | 650,369.2 kWH | = | 6.65E-04 kWH/CFM-HR |
|           | 5408 CFM  | x | 1163 HR/YR    |   |                     |
| HOAOHC    | 1369.91 MBtu  | - | 585.8 MBtu    | = | 2.55E+01 Btu/CFM-HR |
|           | 5408 CFM  | x | 5684 HR/YR    |   |                     |
| HOAOH     | 1369.91 MBtu  | - | 585.8 MBtu    | = | 4.10E+01 Btu/CFM-HR |
|           | 5408 CFM  | x | 3535 HR/YR    |   |                     |
| COAOHC    | 654,550.2 kWH   | - | 630,161.1 kWH | = | 7.93E-04 kWH/CFM-HR |
|           | 5408 CFM  | x | 5684 HR/YR    |   |                     |
| COAOC     | 654,550.2 kWH   | - | 630,161.1 kWH | = | 2.10E-03 kWH/CFM-HR |
|           | 5408 CFM  | x | 2149 HR/YR    |   |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | = | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | = | 0.17                |
| ECC       | 571,465.0 kWH   | - | 567,046.6 kWH | = | 7.60E-05 kWH/CFM-HR |
|           | 27040 CFM   | x | 2149 HR/YR    |   |                     |
| ECHC      | 571,465.0 kWH   | - | 567,046.6 kWH | = | 2.87E-05 kWH/CFM-HR |
|           | 27040 CFM   | x | 5684 HR/YR    |   |                     |
| NSUCHC    | 654,550.2 kWH   | - | 571,465.0 kWH | = | 9.99E-04 kWH/CFM-HR |
|           | 27040 CFM   | x | 3076 HR/YR    |   |                     |
| NSUCC     | 654,550.2 kWH   | - | 571,465.0 kWH | = | 2.64E-03 kWH/CFM-HR |
|           | 27040 CFM   | x | 1163 HR/YR    |   |                     |
| DDCCHC    | 654,550.2 kWH   | - | 631,974.8 kWH | = | 1.47E-04 kWH/CFM-HR |
|           | 27040 CFM   | x | 5684 HR/YR    |   |                     |
| DDCCC     | 654,550.2 kWH   | - | 631,974.8 kWH | = | 3.89E-04 kWH/CFM-HR |
|           | 27040 CFM   | x | 2149 HR/YR    |   |                     |
| NSC       | 1369.91 MBtu  | - | 957.57 MBtu   | = | 5.80E+04 Btu/UA     |
|           | 7107.36 UA  |   |               |   |                     |
| DDCH      | 1369.91 MBtu  | - | 940.54 MBtu   | = | 6.04E+04 Btu/UA     |
|           | 7107.36 UA  |   |               |   |                     |
| OPT       | ( 2 HR/DAY X 240 DAY/YR )                             | - | 175 HR/YR     | = | 305 HR/YR           |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               | = | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01          | = | 5.67 HR/YR          |





INPUT LOADS ..

```

$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

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## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

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        LINE-4 *BASELINE SIMULATION FOR BLDG. 7485      *
        LINE-5 *BOWLING ALLEY                          * ..

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ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
LOADS-REPORT  VERIFICATION=(LV-D)
              SUMMARY=(LS-C,LS-D)
              HOURLY-DATA-SAVE = YES ..
BUILDING-LOCATION  LATITUDE = 39.0
                  LONGITUDE = 96.5
                  ALTITUDE = 1065.
                  TIME-ZONE = 6
                  GROSS-AREA = 35216
                  SHIELDING-COEF = 0.29
                  X-REF = 0.0
                  Y-REF = 0.0 ..
RUN-PERIOD    JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

```

LD_ON      =DAY-SCHEDULE (1,24) (1.) ..
LD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
LD_LT-M-TR =DAY-SCHEDULE (1,7) (0.)
                  (8) (0.5)
                  (9,24) (1.) ..
LD_LT-F&ST =DAY-SCHEDULE (1,2) (1.,0.5)
                  (3,7) (0.)
                  (8) (0.5)
                  (9,24) (1.) ..
LD_LT-SUND =DAY-SCHEDULE (1,10) (0.)
                  (11) (0.5)
                  (12,21) (1.)
                  (22) (0.5)
                  (23,24) (0.) ..
LD_PE-M-TR =DAY-SCHEDULE (1,7) (0.)
                  (8) (0.01)

```

(9,16) (0.2)  
 (17) (0.3)  
 (18,21) (0.5)  
 (22,24) (0.3,0.2,0.1) ..

LD\_PE-F&ST =DAY-SCHEDULE (1,2) (0.3,0.1)  
 (3,7) (0.)  
 (8) (0.1)  
 (9,10) (0.2)  
 (11,13) (0.5)  
 (14,16) (0.3)  
 (17) (0.4)  
 (18,19) (0.75)  
 (20,22) (1.)  
 (23,24) (0.75,0.5) ..

LE\_PE-SUND =DAY-SCHEDULE (1,10) (0.)  
 (11) (0.1)  
 (12,17) (0.6)  
 (18,20) (0.75)  
 (21,22) (0.5,0.1)  
 (23,24) (0.) ..

LW\_ON =WEEK-SCHEDULE (ALL) LD\_ON ..

LW\_OFF =WEEK-SCHEDULE (ALL) LD\_OFF ..

LW\_LITES =WEEK-SCHEDULE (MON) LD\_LT-M-TR  
 (TUE) LD\_LT-M-TR  
 (WED) LD\_LT-M-TR  
 (THU) LD\_LT-M-TR  
 (FRI) LD\_LT-F&ST  
 (SAT) LD\_LT-F&ST  
 (SUN) LD\_LT-SUND  
 (HOL) LD\_LT-SUND ..

LW\_PEOPLE =WEEK-SCHEDULE (MON) LD\_PE-M-TR  
 (TUE) LD\_PE-M-TR  
 (WED) LD\_PE-M-TR  
 (THU) LD\_PE-M-TR  
 (FRI) LD\_PE-F&ST  
 (SAT) LD\_PE-F&ST  
 (SUN) LE\_PE-SUND  
 (HOL) LE\_PE-SUND ..

\$ ON 100% OF THE TIME

L\_ON =SCHEDULE THRU DEC 31 LW\_ON ..

\$ OFF 100% OF THE TIME

L\_OFF =SCHEDULE THRU DEC 31 LW\_OFF ..

\$ LIGHTING LOAD

L\_LITES =SCHEDULE THRU DEC 31 LW\_LITES ..

\$ PEOPLE LOAD

L\_PEOPLE =SCHEDULE THRU DEC 31 LW\_PEOPLE ..

## \$ CONSTRUCTION TYPES

## \$ EXTERIOR WALL ON OLD CONSTRUCTION

WALL-OLD =LAYERS MATERIAL=(BK01,AL21,CB31) I-F-R= 0.6100  
THICKNESS=(0.333,0.000,0.667) ..EXWALL-O =CONSTRUCTION LAYERS = WALL-OLD  
ABSORPTANCE = 0.880  
ROUGHNESS = 2 ..FLOOR =CONSTRUCTION U-VALUE = 0.020  
ABSORPTANCE = 0.610  
ROUGHNESS = 5 ..

## \$ BUILT-UP ROOF ON OLD CONSTRUCTION

ROOF-OLD =LAYERS MATERIAL=(HF-E2,HF-A3,IN24,HF-A3,AL33,AC02)  
THICKNESS=(0.042,0.005,0.250,0.005,0.000,0.042) ..OLD-ROOF =CONSTRUCTION LAYERS = ROOF-OLD  
ABSORPTANCE = 0.800  
ROUGHNESS = 1 ..

## \$ STANDARD METAL DOOR

DOOR-MET =CONSTRUCTION U-VALUE = 0.020  
ABSORPTANCE = 0.860  
ROUGHNESS = 5 ..

## \$ EXTERIOR WALL ON NEW CONSTRUCTION

WALL-NEW =LAYERS MATERIAL=(BK01,IN45,AL21,CB31) I-F-R= 0.6100  
THICKNESS=(0.333,0.167,0.000,0.667) ..EXWALL-N =CONSTRUCTION LAYERS = WALL-NEW  
ABSORPTANCE = 0.880  
ROUGHNESS = 2 ..

## \$ BUILT-UP ROOF ON NEW CONSTRUCTION

ROOF-NEW =LAYERS MATERIAL=(HF-E2,HF-A3,IN05,HF-A3,AL33,AC02)  
THICKNESS=(0.042,0.005,0.807,0.005,0.000,0.042) ..NEW-ROOF =CONSTRUCTION LAYERS = ROOF-NEW  
ABSORPTANCE = 0.800  
ROUGHNESS = 1 ..1\_PN\_STD =GLASS-TYPE GLASS-TYPE-CODE = 2  
PANES = 1 ..

## \$ SPACE DESCRIPTION

N\_OLD\_SPAC =SPACE AREA = 2256.0 VOLUME = 49632.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED

PEOPLE-SCHEDULE = L\_PEOPLE PEOPLE-HG-LAT = 870.0  
 PEOPLE-HG-SENS = 580.0 LIGHTING-TYPE = SUS-FLUOR  
 LIGHTING-W/SQFT = 0.5 LIGHT-TO-SPACE = 1.0  
 LIGHTING-SCHEDULE = L\_LITES EQUIP-SCHEDULE = L\_LITES  
 SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.3  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.01  
 INF-SCHEDULE = L\_ON ..

E-W HEIGHT = 22.0 WIDTH = 141.0 CONS = EXWALL-O  
 AZIMUTH = 31 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 2.5 CONS = DOOR-MET  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 22.0 WIDTH = 16.0 CONS = EXWALL-O  
 AZIMUTH = 301 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 16.0 WIDTH = 141.0 CONS = FLOOR ..

ROOF HEIGHT = 16.0 WIDTH = 141.0 CONS = OLD-ROOF  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

CR\_OLD\_SPA =SPACE AREA = 11750.0 VOLUME = 258500.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 52.5  
 PEOPLE-HG-LAT = 870.0 PEOPLE-HG-SENS = 580.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.25  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITES  
 EQUIP-SCHEDULE = L\_LITES EQUIPMENT-KW = 2.3  
 SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.3  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.01  
 INF-SCHEDULE = L\_ON ..

U-W HEIGHT = 94.0 WIDTH = 125.0 CONS = FLOOR ..

ROOF HEIGHT = 94.0 WIDTH = 125.0 CONS = OLD-ROOF  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

S\_OLD\_SPAC =SPACE AREA = 3762.0 VOLUME = 82764.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 18.8  
 PEOPLE-HG-LAT = 870.0 PEOPLE-HG-SENS = 580.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.25  
 LIGHTING-KW = 0.8 LIGHT-TO-SPACE = 1.0  
 LIGHTING-SCHEDULE = L\_LITES  
 EQUIP-SCHEDULE = L\_PEOPLE EQUIPMENT-KW = 3.28  
 SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.3  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.01  
 INF-SCHEDULE = L\_ON ..

E-W HEIGHT = 22.0 WIDTH = 30.0 CONS = EXWALL-O

AZIMUTH = 301 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 22.0 WIDTH = 115.0 CONS = EXWALL-O  
AZIMUTH = 211 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 8.8 WIDTH = 3.3 G-T = 1\_PN\_STD  
MULTIPLIER = 6.0 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 2.5 CONS = DOOR-MET  
MULTIPLIER = 2.0 SETBACK = 0.2  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 30.0 WIDTH = 125.5 CONS = FLOOR ..

ROOF HEIGHT = 30.0 WIDTH = 125.5 CONS = OLD-ROOF  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

W\_OLD\_SPAC =SPACE AREA = 1504.0 VOLUME = 33088.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 3.8  
PEOPLE-HG-LAT = 870.0 PEOPLE-HG-SENS = 580.0  
LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.25  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITES  
EQUIP-SCHEDULE = L\_LITES EQUIPMENT-KW = 0.1  
SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.3  
INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.01  
INF-SCHEDULE = L\_ON ..

E-W HEIGHT = 22.0 WIDTH = 94.0 CONS = EXWALL-O  
AZIMUTH = 301 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 16.0 WIDTH = 94.0 CONS = FLOOR ..

ROOF HEIGHT = 16.0 WIDTH = 94.0 CONS = OLD-ROOF  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

N\_NEW\_SPAC =SPACE AREA = 3180.0 VOLUME = 69960.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOPLE PEOPLE-HG-LAT = 870.0  
PEOPLE-HG-SENS = 580.0 LIGHTING-TYPE = SUS-FLUOR  
LIGHTING-W/SQFT = 0.5 LIGHT-TO-SPACE = 1.0  
LIGHTING-SCHEDULE = L\_LITES EQUIP-SCHEDULE = L\_LITES  
SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.3  
INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.01  
INF-SCHEDULE = L\_ON ..

E-W HEIGHT = 22.0 WIDTH = 106.0 CONS = EXWALL-N  
AZIMUTH = 31 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 2.5 CONS = DOOR-MET  
 MULTIPLIER = 2.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 22.0 WIDTH = 9.0 CONS = EXWALL-N  
 AZIMUTH = 301 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 22.0 WIDTH = 30.0 CONS = EXWALL-N  
 AZIMUTH = 121 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 30.0 WIDTH = 106.0 CONS = FLOOR ..

ROOF HEIGHT = 30.0 WIDTH = 106.0 CONS = NEW-ROOF  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

CR\_NEW\_SPC =SPACE AREA = 7728.0 VOLUME = 170016.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 52.5  
 PEOPLE-HG-LAT = 870.0 PEOPLE-HG-SENS = 580.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.25  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITES  
 EQUIP-SCHEDULE = L\_LITES EQUIPMENT-KW = 1.5  
 SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.3  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.01  
 INF-SCHEDULE = L\_ON ..

U-W HEIGHT = 84.0 WIDTH = 92.0 CONS = FLOOR ..

U-W HEIGHT = 84.0 WIDTH = 92.0 CONS = FLOOR ..

U-W HEIGHT = 84.0 WIDTH = 92.0 CONS = FLOOR ..

ROOF HEIGHT = 84.0 WIDTH = 92.0 CONS = OLD-ROOF  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

ROOF HEIGHT = 84.0 WIDTH = 92.0 CONS = NEW-ROOF  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

S\_NEW\_SPAC =SPACE AREA = 2712.0 VOLUME = 59664.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 18.8  
 PEOPLE-HG-LAT = 870.0 PEOPLE-HG-SENS = 580.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.25  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITES  
 EQUIP-SCHEDULE = L\_LITES EQUIPMENT-KW = 1.46  
 SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.3  
 INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.01  
 INF-SCHEDULE = L\_ON ..

U-W HEIGHT = 30.0 WIDTH = 84.0 CONS = FLOOR ..

ROOF HEIGHT = 30.0 WIDTH = 84.0 CONS = OLD-ROOF

TILT = 0 SKY-FORM-FACTOR = 1.0 ..

U-W HEIGHT = 30.0 WIDTH = 90.4 CONS = FLOOR ..

ROOF HEIGHT = 30.0 WIDTH = 90.4 CONS = NEW-ROOF  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

E-W HEIGHT = 22.0 WIDTH = 80.0 CONS = EXWALL-N  
AZIMUTH = 211 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 8.8 WIDTH = 3.3 G-T = 1\_PN\_STD  
MULTIPLIER = 3.0 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 7.0 WIDTH = 11.5 G-T = 1\_PN\_STD  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 22.0 WIDTH = 30.0 CONS = EXWALL-N  
AZIMUTH = 121 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 8.8 WIDTH = 3.3 CONS = EXWALL-O  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E\_NEW\_SPAC =SPACE AREA = 2024.0 VOLUME = 44528.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOPLE NUMBER-OF-PEOPLE = 3.8  
PEOPLE-HG-LAT = 870.0 PEOPLE-HG-SENS = 580.0  
LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.25  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITES  
EQUIP-SCHEDULE = L\_LITES EQUIPMENT-KW = 0.1  
SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.3  
INF-METHOD = AIR-CHANGE AIR-CHANGES/HR = 0.01  
INF-SCHEDULE = L\_ON ..

U-W HEIGHT = 22.0 WIDTH = 92.0 CONS = FLOOR ..

E-W HEIGHT = 22.0 WIDTH = 92.0 CONS = EXWALL-N  
AZIMUTH = 121 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 22.0 WIDTH = 92.0 CONS = NEW-ROOF  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

ROOF HEIGHT = 22.0 WIDTH = 92.0 CONS = OLD-ROOF  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

E-W HEIGHT = 22.0 WIDTH = 92.0 CONS = EXWALL-O  
AZIMUTH = 121 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

END ..  
COMPUTE LOADS ..

INPUT SYSTEMS ..

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$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

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## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

```

LINE-4 \*BASELINE SIMULATION FOR BLDG. 7485 \*

LINE-5 \*BOWLING ALLEY \* ..

ABORT ERRORS ..

DIAGNOSTIC WARNINGS ..

SYSTEMS-REPORT VERIFICATION=(SV-A)

SUMMARY=(SS-A,SS-C,SS-K,SS-O)

.. HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..

SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

SD\_S\_HT\_F =DAY-SCHEDULE (1,24) (71.8) ..

SD\_S\_CL\_F =DAY-SCHEDULE (1,24) (72.) ..

SD\_CL\_PIN =DAY-SCHEDULE (1,24) (85.) ..

SD\_HT\_PIN =DAY-SCHEDULE (1,24) (55.) ..

SD\_W\_HT\_F =DAY-SCHEDULE (1,24) (74.) ..

SD\_W\_CL\_F =DAY-SCHEDULE (1,24) (74.2) ..

SD\_OA% =DAY-SCHEDULE (1,24) (0.2) ..

SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..

SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_S\_HT\_F =WEEK-SCHEDULE (ALL) SD\_S\_HT\_F ..

SW\_S\_CL\_F =WEEK-SCHEDULE (ALL) SD\_S\_CL\_F ..

SW\_CL\_PIN =WEEK-SCHEDULE (ALL) SD\_CL\_PIN ..

SW\_HT\_PIN =WEEK-SCHEDULE (ALL) SD\_HT\_PIN ..

SW\_W\_HT\_F =WEEK-SCHEDULE (ALL) SD\_W\_HT\_F ..

SW\_W\_CL\_F =WEEK-SCHEDULE (ALL) SD\_W\_CL\_F ..

SW\_OA% =WEEK-SCHEDULE (ALL) SD\_OA% ..

## \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..



## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
 THRU OCT 1 SW\_S\_HT\_F  
 THRU DEC 31 SW\_W\_HT\_F ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
 THRU OCT 15 SW\_S\_CL\_F  
 THRU DEC 31 SW\_W\_CL\_F ..

## \$ HEATING SET TEMP =55F

S\_HTIN\_PIN =SCHEDULE THRU DEC 31 SW\_HT\_PIN ..

## \$ COOLING SET TEMP =85F

S\_CLIN\_PIN =SCHEDULE THRU DEC 31 SW\_CL\_PIN ..

S\_HRLY-RPT =SCHEDULE THRU JAN 13 SW\_OFF

THRU JAN 15 SW\_ON

THRU AUG 20 SW\_OFF

THRU AUG 22 SW\_ON

THRU DEC 31 SW\_OFF ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

## \$ ZONE DESCRIPTION

N\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 55.0 DESIGN-COOL-T = 85.0  
 HEAT-TEMP-SCH = S\_HTIN\_PIN COOL-TEMP-SCH = S\_CLIN\_PIN  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 2200.  
 SIZING-OPTION = FROM-LOADS  
 HEATING-CAPACITY = -82200.0 ..

CR\_OLD\_SPA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

S\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F

ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

W\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

N\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 55.0 DESIGN-COOL-T = 85.0  
 HEAT-TEMP-SCH = S\_HTIN\_PIN COOL-TEMP-SCH = S\_CLIN\_PIN  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 1630.  
 SIZING-OPTION = FROM-LOADS  
 HEATING-CAPACITY = -54800.0 ..

CR\_NEW\_SPC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

S\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

E\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

#### \$ SYSTEM DESCRIPTION

OLD\_SYSTEM =SYSTEM SYSTEM-TYPE = DDS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 OA-CONTROL = FIXED SUPPLY-CFM = 16000.  
 RATED-CFM = 16000. MIN-AIR-SCH = S\_OA%  
 SUPPLY-DELTA-T = 3.4 SUPPLY-KW = 0.00109  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 MAX-FAN-RATIO = 1.0 NIGHT-CYCLE-CTRL = STAY-OFF  
 NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 1.0  
 COOLING-CAPACITY = 557000. COOL-SH-CAP = 354000.  
 HEATING-CAPACITY = -640000.  
 SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DIRECT  
 ZONE-NAMES = (CR\_OLD\_SPA, S\_OLD\_SPAC, W\_OLD\_SPAC) ..

NEW\_SYSTEM =SYSTEM SYSTEM-TYPE = VAVS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED

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COOLING-SCHEDULE = S_CL_SCHED  PREHEAT-T = 0.0
COOL-CONTROL = WARMEST  OA-CONTROL = FIXED
SUPPLY-CFM = 10000.  RATED-CFM = 10000.
MIN-AIR-SCH = S_OA%  FAN-CONTROL = CONSTANT-VOLUME
SUPPLY-DELTA-T = 3.4  SUPPLY-KW = 0.00109
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
MAX-FAN-RATIO = 1.0  NIGHT-CYCLE-CTRL = STAY-OFF
NIGHT-VENT-DT = 0.0  MIN-CFM-RATIO = 1.0
REHEAT-DELTA-T = 65.  COOLING-CAPACITY = 309000.
COOL-SH-CAP = 232000.  COOL-CTRL-RANGE = 2.
HEATING-CAPACITY = -525000.
SIZING-OPTION = COINCIDENT  RETURN-AIR-PATH = DIRECT
ZONE-NAMES = (CR_NEW_SPAC, S_NEW_SPAC, E_NEW_SPAC) ..

```

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UNIT-HEATR =SYSTEM  SYSTEM-TYPE = UHT
MAX-SUPPLY-T = 120.0  HEATING-SCHEDULE = S_HE-SCHED
RATED-CFM = 4050.  FAN-SCHEDULE = S_HE-SCHED
SUPPLY-DELTA-T = 0.2  SUPPLY-KW = 0.00006
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY
HEATING-CAPACITY = -137000.
ZONE-NAMES = (N_OLD_SPAC, N_NEW_SPAC) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

BLOCK_#1  =REPORT-BLOCK VARIABLE-TYPE = N_OLD_SPAC
          VARIABLE-LIST = (17,18,7,6) ..
BLOCK_#2  =REPORT-BLOCK VARIABLE-TYPE = S_OLD_SPAC
          VARIABLE-LIST = (17,18,7,6) ..
AHU_DD    =REPORT-BLOCK VARIABLE-TYPE = OLD_SYSTEM
          VARIABLE-LIST = (1,2,3,4,5,6,17) ..
AHU_VAV   =REPORT-BLOCK VARIABLE-TYPE = NEW_SYSTEM
          VARIABLE-LIST = (1,2,3,4,5,6,17) ..
BLOCK_#5  =REPORT-BLOCK VARIABLE-TYPE = N_NEW_SPAC
          VARIABLE-LIST = (17,18,7,6) ..
BLOCK_#6  =REPORT-BLOCK VARIABLE-TYPE = S_NEW_SPAC
          VARIABLE-LIST = (17,18,7,6) ..
OLD_ZONES = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (BLOCK_#1,BLOCK_#2)
..
NEW_ZONES = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (BLOCK_#5,BLOCK_#6)
..
DD_RPT    = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (AHU_DD)
..
VAV_RPT   = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (AHU_VAV)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

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\$ E Z - D O E P L A N T S I N P U T \$  
\$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*  
  
LINE-4 \*BASELINE SIMULATION FOR BLDG. 7485 \*  
LINE-5 \*BOWLING ALLEY \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
PLANT-REPORT VERIFICATION=(PV-A)  
SUMMARY=(PS-B,BEPS)  
HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..

PD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

PW\_ON =WEEK-SCHEDULE (ALL) PD\_ON ..

PW\_OFF =WEEK-SCHEDULE (ALL) PD\_OFF ..

## \$ HEATING SEASON

P\_HEAT =SCHEDULE THRU MAY 15 PW\_ON  
THRU OCT 1 PW\_OFF  
THRU DEC 31 PW\_ON ..

## \$ COOLING SEASON

P\_COOL =SCHEDULE THRU MAY 15 PW\_OFF  
THRU OCT 1 PW\_ON  
THRU DEC 31 PW\_OFF ..

## \$ EQUIPMENT DESCRIPTION

BOILER\_HW =PLANT-EQUIPMENT TYPE = HW-BOILER  
SIZE = -999. ..

CHILLER-CW =PLANT-EQUIPMENT TYPE = HERM-REC-CHLR  
SIZE = -999. INSTALLED-NUMBER = 3  
MAX-NUMBER-AVAIL = 3 ..

PLANT-PARAMETERS BOILER-FUEL = NATURAL-GAS HERM-REC-COND-TYPE = AIR  
CCIRC-HEAD = 0.0 HCIRC-HEAD = 30.0  
HCIRC-DESIGN-T-DROP = 20.0 ..

ENERGY-RESOURCE RESOURCE = ELECTRICITY ..  
ENERGY-RESOURCE RESOURCE = NATURAL-GAS ..

HEATIN-SCH =LOAD-ASSIGNMENT TYPE = HEATING  
OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = BOILER\_HW  
NUMBER = 1 ..

COOLIN-SCH =LOAD-ASSIGNMENT TYPE = COOLING  
OPERATION-MODE = RUN-NEEDED

LOAD-RANGE = 0.000  
PLANT-EQUIPMENT = CHILLER-CW  
NUMBER = 3 ..

END ..  
COMPUTE PLANT ..  
STOP ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 9: 1:13 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

NUMBER OF EXTERIOR SURFACES 23 RECTANGULAR 23 OTHER 0  
 (U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED )

| SURFACE    | SPACE | U-VALUE<br>(BTU/HR-SQFT-F) | GLASS<br>(SQFT) | AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | WALL<br>(SQFT) | AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | WALL + GLASS<br>(SQFT) | AREA<br>(SQFT) | AZIMUTH |
|------------|-------|----------------------------|-----------------|----------------|----------------------------|----------------|----------------|----------------------------|------------------------|----------------|---------|
| N_OLD_SPAC |       | 0.000                      | 0.00            | 0.00           | 0.236                      | 0.00           | 3102.00        | 0.236                      | 3102.00                | 3102.00        | NORTH   |
| N_NEW_SPAC |       | 0.000                      | 0.00            | 0.00           | 0.060                      | 0.00           | 2332.00        | 0.060                      | 2332.00                | 2332.00        | NORTH   |
| S_NEW_SPAC |       | 0.000                      | 0.00            | 0.00           | 0.060                      | 0.00           | 660.00         | 0.060                      | 660.00                 | 660.00         | EAST    |
| E_NEW_SPAC |       | 0.000                      | 0.00            | 0.00           | 0.060                      | 0.00           | 660.00         | 0.060                      | 660.00                 | 660.00         | EAST    |
| S_NEW_SPAC |       | 0.000                      | 0.00            | 0.00           | 0.060                      | 0.00           | 2024.00        | 0.060                      | 2024.00                | 2024.00        | EAST    |
| S_NEW_SPAC |       | 1.021                      | 167.62          | 0.00           | 0.236                      | 0.00           | 2024.00        | 0.236                      | 2024.00                | 2024.00        | EAST    |
| S_OLD_SPAC |       | 1.021                      | 174.24          | 0.00           | 0.060                      | 0.00           | 1592.38        | 0.151                      | 1760.00                | 1760.00        | SOUTH   |
| W_OLD_SPAC |       | 0.000                      | 0.00            | 0.00           | 0.236                      | 0.00           | 2355.76        | 0.290                      | 2530.00                | 2530.00        | SOUTH   |
| S_OLD_SPAC |       | 0.000                      | 0.00            | 0.00           | 0.236                      | 0.00           | 2068.00        | 0.236                      | 2068.00                | 2068.00        | WEST    |
| N_NEW_SPAC |       | 0.000                      | 0.00            | 0.00           | 0.060                      | 0.00           | 660.00         | 0.060                      | 660.00                 | 660.00         | WEST    |
| N_OLD_SPAC |       | 0.000                      | 0.00            | 0.00           | 0.236                      | 0.00           | 352.00         | 0.236                      | 352.00                 | 352.00         | WEST    |
| CR_NEW_SPC |       | 0.000                      | 0.00            | 0.00           | 0.028                      | 0.00           | 3180.00        | 0.028                      | 3180.00                | 3180.00        | ROOF    |
| CR_NEW_SPC |       | 0.000                      | 0.00            | 0.00           | 0.074                      | 0.00           | 7728.00        | 0.074                      | 7728.00                | 7728.00        | ROOF    |
| S_NEW_SPAC |       | 0.000                      | 0.00            | 0.00           | 0.074                      | 0.00           | 2520.00        | 0.074                      | 2520.00                | 2520.00        | ROOF    |
| W_OLD_SPAC |       | 0.000                      | 0.00            | 0.00           | 0.028                      | 0.00           | 2712.00        | 0.028                      | 2712.00                | 2712.00        | ROOF    |
| S_OLD_SPAC |       | 0.000                      | 0.00            | 0.00           | 0.074                      | 0.00           | 1504.00        | 0.074                      | 1504.00                | 1504.00        | ROOF    |
| E_NEW_SPAC |       | 0.000                      | 0.00            | 0.00           | 0.074                      | 0.00           | 11750.00       | 0.074                      | 11750.00               | 11750.00       | ROOF    |
| E_NEW_SPAC |       | 0.000                      | 0.00            | 0.00           | 0.028                      | 0.00           | 3765.00        | 0.074                      | 3765.00                | 3765.00        | ROOF    |
| E_NEW_SPAC |       | 0.000                      | 0.00            | 0.00           | 0.028                      | 0.00           | 2024.00        | 0.028                      | 2024.00                | 2024.00        | ROOF    |
| E_NEW_SPAC |       | 0.000                      | 0.00            | 0.00           | 0.074                      | 0.00           | 2024.00        | 0.074                      | 2024.00                | 2024.00        | ROOF    |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 9: 1:13 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

|            |       |      |       |          |       |          |           |
|------------|-------|------|-------|----------|-------|----------|-----------|
| N_OLD_SPAC | 0.000 | 0.00 | 0.074 | 2256.00  | 0.074 | 2256.00  | ROOF      |
| N_OLD_SPAC | 0.000 | 0.00 | 0.020 | 2256.00  | 0.020 | 2256.00  | UNDERGRND |
| CR_OLD_SPA | 0.000 | 0.00 | 0.020 | 11750.00 | 0.020 | 11750.00 | UNDERGRND |
| S_OLD_SPAC | 0.000 | 0.00 | 0.020 | 3765.00  | 0.020 | 3765.00  | UNDERGRND |
| W_OLD_SPAC | 0.000 | 0.00 | 0.020 | 1504.00  | 0.020 | 1504.00  | UNDERGRND |
| N_NEW_SPAC | 0.000 | 0.00 | 0.020 | 3180.00  | 0.020 | 3180.00  | UNDERGRND |
| CR_NEW_SPC | 0.000 | 0.00 | 0.020 | 7728.00  | 0.020 | 7728.00  | UNDERGRND |
| CR_NEW_SPC | 0.000 | 0.00 | 0.020 | 7728.00  | 0.020 | 7728.00  | UNDERGRND |
| S_NEW_SPC  | 0.000 | 0.00 | 0.020 | 2520.00  | 0.020 | 2520.00  | UNDERGRND |
| S_NEW_SPAC | 0.000 | 0.00 | 0.020 | 2712.00  | 0.020 | 2712.00  | UNDERGRND |
| E_NEW_SPAC | 0.000 | 0.00 | 0.020 | 2024.00  | 0.020 | 2024.00  | UNDERGRND |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 9: 1:13 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS

\*\*\* BUILDING \*\*\*

| FLOOR AREA           |  | 34916           | SQFT | 3244       | SQMT | HEATING LOAD |  |
|----------------------|--|-----------------|------|------------|------|--------------|--|
| VOLUME               |  | 768152          | CUFT | 21754      | CUMT | =====        |  |
| TIME                 |  | COOLING LOAD    |      | JAN 15 7AM |      | =====        |  |
| DRY-BULB TEMP        |  | JUL 23 8PM      |      | -7F        |      | -22C         |  |
| WET-BULB TEMP        |  | 91F             |      | 33C        |      | -8F          |  |
|                      |  | 77F             |      | 25C        |      |              |  |
|                      |  | =====           |      |            |      |              |  |
|                      |  | SENSIBLE        |      | LATENT     |      | SENSIBLE     |  |
|                      |  | (KBTU/H)        |      | (KW)       |      | (KBTU/H)     |  |
|                      |  | (KW)            |      | (KW)       |      | (KW)         |  |
| WALLS                |  | 57.468          |      | 16.831     |      | -224.260     |  |
| ROOFS                |  | 104.978         |      | 30.745     |      | -237.339     |  |
| GLASS CONDUCTION     |  | 5.365           |      | 1.571      |      | -24.792      |  |
| GLASS SOLAR          |  | 19.927          |      | 5.836      |      | 0.878        |  |
| DOOR                 |  | 0.188           |      | 0.055      |      | -0.747       |  |
| INTERNAL SURFACES    |  | 0.000           |      | 0.000      |      | 0.000        |  |
| UNDERGROUND SURFACES |  | -9.497          |      | -2.781     |      | -30.373      |  |
| OCCUPANTS TO SPACE   |  | 96.973          |      | 28.401     |      | 11.021       |  |
| LIGHT TO SPACE       |  | 130.067         |      | 38.093     |      | 33.017       |  |
| EQUIPMENT TO SPACE   |  | 27.077          |      | 7.930      |      | 4.071        |  |
| PROCESS TO SPACE     |  | 0.000           |      | 0.000      |      | 0.000        |  |
| INFILTRATION         |  | 2.439           |      | 0.714      |      | -1.246       |  |
| TOTAL                |  | 434.985         |      | 127.396    |      | -469.771     |  |
| TOTAL LOAD           |  | 617.968         |      | 182.983    |      | -137.584     |  |
| TOTAL LOAD / AREA    |  | 17.70BTU/H.SQFT |      | 55.795     |      | 42.414       |  |
|                      |  | KW              |      | W /SQMT    |      | KW           |  |

\*\*\*\*\*  
 \* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR \*  
 \* --- LOADS \*  
 \* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION \*  
 \* IN CONSIDERATION \*  
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EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 9: 1:13 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR OLD\_SYSTEM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                   |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -131.179                    | 15                      | 7                    | -8.F                 | -431.251                                | 25782.                    | 45.178                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -92.958                     | 3                       | 7                    | -6.F                 | -397.991                                | 23218.                    | 45.178                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -63.926                     | 3                       | 7                    | 12.F                 | -298.153                                | 25857.                    | 45.178                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -11.263                     | 5                       | 7                    | 27.F                 | -190.202                                | 25125.                    | 45.178                          |
| MAY   | 59.01812                    | 16                      | 2                    | 59.F                 | 403.097                                 | -0.884                      | 5                       | 7                    | 40.F                 | -34.729                                 | 25601.                    | 45.178                          |
| JUN   | 144.31564                   | 24                      | 20                   | 83.F                 | 408.129                                 | 0.000                       |                         |                      |                      | 0.000                                   | 25020.                    | 45.178                          |
| JUL   | 188.20775                   | 17                      | 19                   | 88.F                 | 489.590                                 | 0.000                       |                         |                      |                      | 0.000                                   | 25707.                    | 45.178                          |
| AUG   | 180.61736                   | 20                      | 20                   | 90.F                 | 437.978                                 | 0.000                       |                         |                      |                      | 0.000                                   | 25857.                    | 45.178                          |
| SEP   | 99.56862                    | 5                       | 18                   | 90.F                 | 413.599                                 | 0.000                       |                         |                      |                      | 0.000                                   | 24945.                    | 45.178                          |
| OCT   | 2.60230                     | 1                       | 18                   | 83.F                 | 251.500                                 | -6.672                      | 20                      | 7                    | 23.F                 | -198.304                                | 25654.                    | 45.178                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -47.621                     | 3                       | 6                    | 13.F                 | -287.183                                | 24711.                    | 45.178                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -111.398                    | 13                      | 7                    | 2.F                  | -370.444                                | 25835.                    | 45.178                          |
| TOTAL | 674.330                     |                         |                      |                      |   | -465.898                    |                         |                      |                      | -431.251                                | 303316.                   | 45.178                          |
| MAX   |                             |                         |                      |                      | 489.590                                 |                             |                         |                      |                      |   |                           |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 9: 1:13 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR OLD\_SYSTEM TOPEKA, KS

| MONTH  | HOURS           |                 |                                 |          | HOURS             |                   |         |                    | HOURS            |                             |  |  | COINCIDENT LOADS                                   |  |
|--------|-----------------|-----------------|---------------------------------|----------|-------------------|-------------------|---------|--------------------|------------------|-----------------------------|--|--|--|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COINCIDENT<br>COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | HEATING<br>FANS ON | NIGHT<br>VENTING | FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0               | 744             | 0                               | 0        | 744               | 0                 | 744     | 0                  | 0                | 0                           | -100.252   | 42.228   | -100.252   | 42.228   |
| FEB    | 0               | 672             | 0                               | 0        | 672               | 0                 | 672     | 0                  | 0                | 0                           | -95.981  | 42.228   | -95.981  | 42.228   |
| MAR    | 0               | 744             | 0                               | 0        | 744               | 0                 | 744     | 0                  | 0                | 0                           | -98.376  | 42.228   | -98.376  | 42.228   |
| APR    | 0               | 720             | 0                               | 0        | 720               | 0                 | 720     | 0                  | 0                | 0                           | -4.695   | 42.883   | -4.695   | 42.883   |
| MAY    | 371             | 360             | 0                               | 13       | 384               | 384               | 744     | 744                | 0                | 13                          | 0.000  | 17.440   | 0.000  | 17.440   |
| JUN    | 709             | 0               | 0                               | 11       | 720               | 720               | 720     | 720                | 0                | 11                          | 0.000  | 45.178   | 0.000  | 45.178   |
| JUL    | 744             | 0               | 0                               | 0        | 744               | 744               | 744     | 744                | 0                | 0                           | 0.000  | 44.359   | 0.000  | 44.359   |
| AUG    | 742             | 0               | 0                               | 0        | 744               | 744               | 744     | 744                | 0                | 0                           | 0.000  | 45.178   | 0.000  | 45.178   |
| SEP    | 567             | 0               | 0                               | 153      | 720               | 720               | 744     | 744                | 0                | 153                         | 0.000  | 44.359   | 0.000  | 44.359   |
| OCT    | 16              | 720             | 0                               | 8        | 24                | 24                | 744     | 744                | 0                | 8                           | 0.000  | 44.359   | 0.000  | 44.359   |
| NOV    | 0               | 720             | 0                               | 0        | 0                 | 0                 | 720     | 744                | 0                | 0                           | -144.346   | 42.228   | -144.346   | 42.228   |
| DEC    | 0               | 744             | 0                               | 0        | 0                 | 0                 | 744     | 744                | 0                | 0                           | -132.184   | 43.539   | -132.184   | 43.539   |
| ANNUAL | 3149            | 5424            | 0                               | 187      | 3336              | 3336              | 8760    | 8760               | 0                | 187                         |  |  |  |  |

EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 9: 1:13 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR NEW\_SYSTEM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      |                             | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G           |                      |                      |                           |                                 | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C |  |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|---|-------------------------|----------------------|----------------------|---------------------------|---------------------------------|---|---------|--|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) |   | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |   |         |  |
| JAN   | 0.00000                     |                         |                      |                      |                             | 0.000                                   | 15                      | 7                    | -7.F                 | -8.F                      | -326.302                        | 17379.                                  | 29.532  |  |
| FEB   | 0.00000                     |                         |                      |                      |                             | 0.000                                   | 3                       | 7                    | -5.F                 | -6.F                      | -300.528                        | 15644.                                  | 29.532  |  |
| MAR   | 0.00000                     |                         |                      |                      |                             | 0.000                                   | 3                       | 7                    | 14.F                 | 12.F                      | -230.062                        | 17454.                                  | 29.532  |  |
| APR   | 0.00000                     |                         |                      |                      |                             | 0.000                                   | 5                       | 7                    | 30.F                 | 27.F                      | -156.843                        | 16941.                                  | 29.532  |  |
| MAY   | 43.52706                    | 30                      | 20                   | 82.F                 | 75.F                        | 279.536                                 | 5                       | 7                    | 44.F                 | 40.F                      | -36.412                         | 17249.                                  | 29.532  |  |
| JUN   | 109.22501                   | 24                      | 20                   | 83.F                 | 74.F                        | 290.725                                 |                         |                      |                      |                           | 0.000                           | 16885.                                  | 29.532  |  |
| JUL   | 141.67694                   | 17                      | 18                   | 88.F                 | 80.F                        | 327.144                                 |                         |                      |                      |                           | 0.000                           | 17305.                                  | 29.532  |  |
| AUG   | 138.15678                   | 20                      | 21                   | 87.F                 | 75.F                        | 300.411                                 |                         |                      |                      |                           | 0.000                           | 17454.                                  | 29.532  |  |
| SEP   | 80.76028                    | 5                       | 18                   | 90.F                 | 77.F                        | 296.429                                 |                         |                      |                      |                           | 0.000                           | 16810.                                  | 29.532  |  |
| OCT   | 2.27719                     | 1                       | 18                   | 83.F                 | 68.F                        | 224.986                                 | 20                      | 7                    | 23.F                 | 23.F                      | -156.662                        | 17277.                                  | 29.532  |  |
| NOV   | 0.00000                     |                         |                      |                      |                             | 0.000                                   | 3                       | 6                    | 13.F                 | 12.F                      | -216.867                        | 16652.                                  | 29.532  |  |
| DEC   | 0.00000                     |                         |                      |                      |                             | 0.000                                   | 13                      | 7                    | 2.F                  | 1.F                       | -277.992                        | 17407.                                  | 29.532  |  |
| TOTAL | 515.623                     |                         |                      |                      |                             | -369.184                                |                         |                      |                      |                           | -326.302                        | 204455.                                 | 29.532  |  |
| MAX   |                             |                         |                      |                      |                             | 327.144                                 |                         |                      |                      |                           |                                 |   |         |  |

EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 9: 1:13 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR NEW\_SYSTEM TOPEKA, KS

| MONTH | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS 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| HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | HOURS |  |  | 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| EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 9: 1:13 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7485 BOWLING ALLEY TOPEKA, KS                   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR UNIT-HEATR                                       |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----                                    |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN  | 0.00000                     |                         |                      |                      | -19.801                     | 15                      | -7.7 F               | -8. F                | -68.725                                 | 1384.                              | 2.823                           |
| FEB  | 0.00000                     |                         |                      |                      | -13.271                     | 3                       | -5. F                | -6. F                | -58.491                                 | 1235.                              | 2.807                           |
| MAR  | 0.00000                     |                         |                      |                      | -7.753                      | 4                       | 14. F                | 12. F                | -38.918                                 | 1375.                              | 2.773                           |
| APR  | 0.00000                     |                         |                      |                      | -0.717                      | 1                       | 54. F                | 50. F                | -18.313                                 | 1327.                              | 2.741                           |
| MAY  | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1333.                              | 2.717                           |
| JUN  | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1318.                              | 2.717                           |
| JUL  | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1341.                              | 2.717                           |
| AUG  | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1363.                              | 2.717                           |
| SEP  | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1307.                              | 2.717                           |
| OCT  | 0.00000                     |                         |                      |                      | -0.404                      | 20                      | 23. F                | 22. F                | -17.871                                 | 1337.                              | 2.745                           |
| NOV  | 0.00000                     |                         |                      |                      | -6.088                      | 3                       | 19. F                | 17. F                | -34.461                                 | 1294.                              | 2.769                           |
| DEC  | 0.00000                     |                         |                      |                      | -16.079                     | 15                      | 11. F                | 9. F                 | -59.484                                 | 1382.                              | 2.804                           |
| TOTAL  | 0.000                       |                         |                      |                      | -64.113                     |                         |                      |                      | -68.725                                 | 15995.                             | 2.823                           |
| MAX  |                             |                         |                      |                      | 0.000                       |                         |                      |                      |   |                                    |                                 |

| EMC ENGINEERS INC. EZDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 9: 1:13 SDL RUN 1 |  |  |  |  |  |  |  |  |  |  |  |
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| DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7485 BOWLING ALLEY TOPEKA, KS                   |  |  |  |  |  |  |  |  |  |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR UNIT-HEATR  |  |  |  |  |  |  |  |  |  |  |  |
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EMC ENGINEERS INC. 80227 E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 9: 1:13 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE BASELINE SIMULATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- PS-B TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>166.035<br>285.215<br>15/20 | NATURAL-GAS<br>363.651<br>1040.591<br>15/ 7 |
|-----|--|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 149.055<br>285.085<br>4/20                 | 271.667<br>967.456<br>3/ 7                  |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 162.527<br>284.090<br>5/22                 | 195.387<br>755.268<br>4/ 7                  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 152.063<br>276.110<br>5/ 9                 | 44.129<br>530.174<br>5/ 7                   |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 184.288<br>486.408<br>31/18                | 6.693<br>126.377<br>5/ 7                    |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 228.216<br>485.616<br>28/18                | 0.000<br>0.000<br>30/ 1                     |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 254.864<br>527.286<br>23/18                | 0.000<br>0.000<br>31/ 1                     |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 256.955<br>513.824<br>21/19                | 0.000<br>0.000<br>31/ 1                     |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 204.836<br>498.186<br>5/18                 | 0.000<br>0.000<br>30/ 1                     |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 155.758<br>411.121<br>1/18                 | 27.486<br>540.833<br>20/ 7                  |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 153.740<br>279.499<br>12/11                | 145.535<br>728.493<br>3/ 6                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 165.597<br>285.127<br>9/20                 | 315.362<br>911.539<br>13/ 7                 |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |  |   |
|     | ONE YEAR<br>USE/PEAK                             | 2233.934<br>527.286                        | 1369.911<br>1040.591                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/22/1995 9: 1:13 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 53.06       | 1369.91     |
| SPACE COOL      | 380.06      | 0.00        |
| HVAC AUX        | 860.55      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 805.77      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 134.53      | 0.00        |
| TOTAL           | 2233.98     | 1369.91     |

TOTAL SITE ENERGY 3603.84 MBTU 102.3 KBTU/SQFT-YR GROSS-AREA 103.2 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 8078.42 MBTU 229.4 KBTU/SQFT-YR GROSS-AREA 231.4 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 41.8  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



INPUT SYSTEMS ..

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## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #1 NIGHT SETBACK FOR BLDG. 7485      *
        LINE-5 *BOWLING ALLEY                          * ..

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

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## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE  (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..
SD_S_HT_SR =DAY-SCHEDULE  (1,7) (84.8)
                (8,24) (71.8) ..
SD_S_CL_SR =DAY-SCHEDULE  (1,7) (85.)
                (8,24) (72.) ..
SD_CL_PIN  =DAY-SCHEDULE  (1,24) (85.) ..
SD_HT_PIN  =DAY-SCHEDULE  (1,24) (55.) ..
SD_W_HT_SR =DAY-SCHEDULE  (1,7) (55.)
                (8,24) (74.) ..
SD_W_CL_SR =DAY-SCHEDULE  (1,7) (55.2)
                (8,24) (74.2) ..
SD_S_HT_FS =DAY-SCHEDULE  (1,2) (71.8)
                (3,7) (84.8)
                (8,24) (71.8) ..
SD_S_CL_FS =DAY-SCHEDULE  (1,2) (72.)
                (3,7) (85.)
                (8,24) (72.) ..
SD_W_HT_FS =DAY-SCHEDULE  (1,2) (74.)
                (3,7) (55.)
                (8,24) (74.) ..
SD_W_CL_FS =DAY-SCHEDULE  (1,2) (74.2)
                (3,7) (55.2)
                (8,24) (74.2) ..
SD_FAN_SR  =DAY-SCHEDULE  (1,7) (0.)
                (8,24) (1.) ..
SD_FAN_FS  =DAY-SCHEDULE  (1,2) (1.)
                (3,7) (0.)
                (8,24) (1.) ..

SW_ON      =WEEK-SCHEDULE  (ALL) SD_ON ..

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SW_OFF      =WEEK-SCHEDULE (ALL) SD_OFF  ..

SW_S_HT_F   =WEEK-SCHEDULE (MON) SD_S_HT_SR
              (TUE) SD_S_HT_SR
              (WED) SD_S_HT_SR
              (THU) SD_S_HT_SR
              (FRI) SD_S_HT_FS
              (SAT) SD_S_HT_FS
              (SUN) SD_S_HT_SR
              (HOL) SD_S_HT_SR ..

SW_S_CL_F   =WEEK-SCHEDULE (MON) SD_S_CL_SR
              (TUE) SD_S_CL_SR
              (WED) SD_S_CL_SR
              (THU) SD_S_CL_SR
              (FRI) SD_S_CL_FS
              (SAT) SD_S_CL_FS
              (SUN) SD_S_CL_SR
              (HOL) SD_S_CL_SR ..

SW_CL_PIN   =WEEK-SCHEDULE (ALL) SD_CL_PIN ..

SW_HT_PIN   =WEEK-SCHEDULE (ALL) SD_HT_PIN ..

SW_W_HT_F   =WEEK-SCHEDULE (MON) SD_W_HT_SR
              (TUE) SD_W_HT_SR
              (WED) SD_W_HT_SR
              (THU) SD_W_HT_SR
              (FRI) SD_W_HT_FS
              (SAT) SD_W_HT_FS
              (SUN) SD_W_HT_SR
              (HOL) SD_W_HT_SR ..

SW_W_CL_F   =WEEK-SCHEDULE (MON) SD_W_CL_SR
              (TUE) SD_W_CL_SR
              (WED) SD_W_CL_SR
              (THU) SD_W_CL_SR
              (FRI) SD_W_CL_FS
              (SAT) SD_W_CL_FS
              (SUN) SD_W_CL_SR
              (HOL) SD_W_CL_SR ..

SW_FAN_CYC  =WEEK-SCHEDULE (MON) SD_FAN_SR
              (TUE) SD_FAN_SR
              (WED) SD_FAN_SR
              (THU) SD_FAN_SR
              (FRI) SD_FAN_FS
              (SAT) SD_FAN_FS
              (SUN) SD_FAN_SR
              (HOL) SD_FAN_SR ..
```

\$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

\$ FULL OFF SYSTEM



S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

\$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
THRU OCT 1 SW\_OFF  
THRU DEC 31 SW\_ON ..

\$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

\$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
THRU OCT 1 SW\_S\_HT\_F  
THRU DEC 31 SW\_W\_HT\_F ..

\$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
THRU OCT 15 SW\_S\_CL\_F  
THRU DEC 31 SW\_W\_CL\_F ..

\$ HEATING SET TEMP =55F

S\_HTIN\_PIN =SCHEDULE THRU DEC 31 SW\_HT\_PIN ..

\$ COOLING SET TEMP =85F

S\_CLIN\_PIN =SCHEDULE THRU DEC 31 SW\_CL\_PIN ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
THRU JAN 16 SW\_ON  
THRU AUG 19 SW\_OFF  
THRU AUG 21 SW\_ON  
THRU DEC 31 SW\_OFF ..

S\_FAN\_CYCL =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

\$ ZONE DESCRIPTION

N\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 55.0 DESIGN-COOL-T = 85.0  
HEAT-TEMP-SCH = S\_HTIN\_PIN COOL-TEMP-SCH = S\_CLIN\_PIN  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 2200.  
SIZING-OPTION = FROM-LOADS  
HEATING-CAPACITY = -82200.0 ..

CR\_OLD\_SPA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

S\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED

THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

W\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..


N\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 55.0 DESIGN-COOL-T = 85.0  
HEAT-TEMP-SCH = S\_HTIN\_PIN COOL-TEMP-SCH = S\_CLIN\_PIN  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 1630.  
SIZING-OPTION = FROM-LOADS  
HEATING-CAPACITY = -54800.0 ..

CR\_NEW\_SPC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

S\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

E\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

#### \$ SYSTEM DESCRIPTION

OLD\_SYSTEM =SYSTEM SYSTEM-TYPE = DDS  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE-SCHED  
COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
OA-CONTROL = FIXED SUPPLY-CFM = 16000.  
RATED-CFM = 16000. MIN-OUTSIDE-AIR = 0.2  
MAX-OA-FRACTION = 0.2 FAN-SCHEDULE = S\_FAN\_CYCL  
SUPPLY-DELTA-T = 3.4 SUPPLY-KW = 0.00109  
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
MAX-FAN-RATIO = 1.0 NIGHT-CYCLE-CTRL = STAY-OFF   
NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 1.0  
COOLING-CAPACITY = 557000. COOL-SH-CAP = 354000.  
HEATING-CAPACITY = -640000.  
SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DIRECT  
ZONE-NAMES = (CR\_OLD\_SPA, S\_OLD\_SPAC, W\_OLD\_SPAC) ..

NEW\_SYSTEM =SYSTEM SYSTEM-TYPE = VAVS  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE-SCHED

```

COOLING-SCHEDULE = S_CL_SCHED PREHEAT-T = 0.0
COOL-CONTROL = WARMEST OA-CONTROL = FIXED
SUPPLY-CFM = 10000. RATED-CFM = 10000.
MIN-OUTSIDE-AIR = 0.2 MAX-OA-FRACTION = 0.2
FAN-SCHEDULE = S_FAN_CYCL
FAN-CONTROL = CONSTANT-VOLUME SUPPLY-DELTA-T = 3.4
SUPPLY-KW = 0.00109
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
MAX-FAN-RATIO = 1.0 NIGHT-CYCLE-CTRL = STAY-OFF
NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 1.0
REHEAT-DELTA-T = 65. COOLING-CAPACITY = 309000.
COOL-SH-CAP = 232000. COOL-CTRL-RANGE = 2.
HEATING-CAPACITY = -525000.
SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DIRECT
ZONE-NAMES = (CR_NEW_SPC, S_NEW_SPAC, E_NEW_SPAC) ..

```

```

UNIT-HEATR =SYSTEM SYSTEM-TYPE = UHT
MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S_HE-SCHED
RATED-CFM = 4050. FAN-SCHEDULE = S_HE-SCHED
SUPPLY-DELTA-T = 0.2 SUPPLY-KW = 0.00006
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY
HEATING-CAPACITY = -137000.
ZONE-NAMES = (N_OLD_SPAC, N_NEW_SPAC) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

BLOCK_#1 =REPORT-BLOCK VARIABLE-TYPE = N_OLD_SPAC
          VARIABLE-LIST = (17,18,7,6) ..
BLOCK_#2 =REPORT-BLOCK VARIABLE-TYPE = S_OLD_SPAC
          VARIABLE-LIST = (17,18,7,6) ..
AHU_DD   =REPORT-BLOCK VARIABLE-TYPE = OLD_SYSTEM
          VARIABLE-LIST = (1,2,3,4,5,6,17) ..
AHU_VAV  =REPORT-BLOCK VARIABLE-TYPE = NEW_SYSTEM
          VARIABLE-LIST = (1,2,3,4,5,6,17) ..
BLOCK_#5 =REPORT-BLOCK VARIABLE-TYPE = N_NEW_SPAC
          VARIABLE-LIST = (17,18,7,6) ..
BLOCK_#6 =REPORT-BLOCK VARIABLE-TYPE = S_NEW_SPAC
          VARIABLE-LIST = (17,18,7,6) ..
OLD_ZONES = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
            REPORT-BLOCK = (BLOCK_#1,BLOCK_#2)
..
NEW_ZONES = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
            REPORT-BLOCK = (BLOCK_#5,BLOCK_#6)
..
DD_RPT   = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
            REPORT-BLOCK = (AHU_DD)
..
VAV_RPT  = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
            REPORT-BLOCK = (AHU_VAV)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

EMC ENGINEERS INC. EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 16:55:40 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR OLD\_SYSTEM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -78.270                     | 15                      | -6.F                 | -7.F                 | -441.163                                | 22311.                             | 45.178                          |
| FEB   | 0.00000                     |                         |                      |                      | -51.749                     | 3                       | -2.F                 | -3.F                 | -433.768                                | 20079.                             | 45.178                          |
| MAR   | 0.00000                     |                         |                      |                      | -30.424                     | 3                       | 15.F                 | 12.F                 | -344.685                                | 22351.                             | 45.178                          |
| APR   | 0.00000                     |                         |                      |                      | -3.176                      | 1                       | 49.F                 | 44.F                 | -123.868                                | 21812.                             | 45.178                          |
| MAY   | 57.52285                    | 16                      | 61.F                 | 59.F                 | -0.195                      | 1                       | 45.F                 | 42.F                 | -8.647                                  | 22096.                             | 45.178                          |
| JUN   | 129.11554                   | 24                      | 83.F                 | 74.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 21636.                             | 45.178                          |
| JUL   | 161.65105                   | 17                      | 88.F                 | 80.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 22271.                             | 45.178                          |
| AUG   | 157.09869                   | 20                      | 90.F                 | 75.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 22351.                             | 45.178                          |
| SEP   | 95.52588                    | 5                       | 90.F                 | 77.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 21596.                             | 45.178                          |
| OCT   | 2.77466                     | 1                       | 83.F                 | 68.F                 | -1.642                      | 20                      | 23.F                 | 22.F                 | -87.945                                 | 22183.                             | 45.178                          |
| NOV   | 0.00000                     |                         |                      |                      | -20.557                     | 3                       | 24.F                 | 21.F                 | -307.950                                | 21293.                             | 45.178                          |
| DEC   | 0.00000                     |                         |                      |                      | -64.393                     | 13                      | 0.F                  | -1.F                 | -420.592                                | 22399.                             | 45.178                          |
| TOTAL | 603.690                     |                         |                      |                      | -250.405                    |                         |                      |                      | -441.163                                | 262392.                            | 45.178                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |

EMC ENGINEERS INC. EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 16:55:40 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR OLD\_SYSTEM TOPEKA, KS

| MONTH | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  | HOURS |  |  |  |
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EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 16:55:40 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 7485 BOWLING ALLEY TOPEKA, KS  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR UNIT-HEATR

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |   |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | MAXIMUM<br>ELEC-<br>TRICAL<br>ENERGY<br>(KWH) |
| JAN   | 0.00000                     |                         |                      |                      | -19.801                     | 15                      | 7                    | -7.F                 | -8.F                                    | 1384.   |
| FEB   | 0.00000                     |                         |                      |                      | -13.271                     | 3                       | 7                    | -5.F                 | -6.F                                    | 1235.   |
| MAR   | 0.00000                     |                         |                      |                      | -7.753                      | 4                       | 7                    | 14.F                 | 12.F                                    | 1375.   |
| APR   | 0.00000                     |                         |                      |                      | -0.717                      | 1                       | 6                    | 54.F                 | 50.F                                    | 1327.   |
| MAY   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1333.   |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1318.   |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1341.   |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1363.   |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1307.   |
| OCT   | 0.00000                     |                         |                      |                      | -0.404                      | 20                      | 8                    | 23.F                 | 22.F                                    | 1337.   |
| NOV   | 0.00000                     |                         |                      |                      | -6.088                      | 3                       | 7                    | 19.F                 | 17.F                                    | 1294.   |
| DEC   | 0.00000                     |                         |                      |                      | -16.079                     | 15                      | 7                    | 11.F                 | 9.F                                     | 1382.   |
| TOTAL | 0.000                       |                         |                      |                      | -64.113                     |                         |                      |                      |   | 15995.  |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      | -68.725                                 | 2.823   |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 16:55:40 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 7485 BOWLING ALLEY TOPEKA, KS  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR UNIT-HEATR

| --COINCIDENT LOADS-- |                          |                          |  |                   |                   |                   |                              |                           |                             |   |         |  |
|----------------------|--------------------------|--------------------------|--|-------------------|-------------------|-------------------|------------------------------|---------------------------|-----------------------------|---|---------|--|
| MONTH                | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS             |                   |                   |                              | HOURS                     |                             | HEATING                                 |         | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
|                      |                          |                          |  | COOLING<br>AVAIL. | HEATING<br>AVAIL. | COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | FLOATING<br>WHEN<br>FANS ON | LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) |         |  |
| JAN                  | 0                        | 740                      | 0  | 4                 | 744               | 0                 | 744                          | 0                         | 0                           | 4                                       | -15.695 | 2.743  |
| FEB                  | 0                        | 663                      | 0  | 9                 | 672               | 0                 | 672                          | 0                         | 0                           | 9                                       | -13.177 | 2.738  |
| MAR                  | 0                        | 546                      | 0  | 198               | 744               | 0                 | 744                          | 0                         | 0                           | 198                                     | -12.723 | 2.738  |
| APR                  | 0                        | 95                       | 0  | 625               | 720               | 0                 | 720                          | 0                         | 0                           | 625                                     | 0.000   | 2.717  |
| MAY                  | 0                        | 0                        | 0  | 744               | 360               | 0                 | 744                          | 384                       | 0                           | 744                                     | 0.000   | 0.000  |
| JUN                  | 0                        | 0                        | 0  | 720               | 0                 | 0                 | 720                          | 720                       | 0                           | 720                                     | 0.000   | 0.000  |
| JUL                  | 0                        | 0                        | 0  | 744               | 0                 | 0                 | 744                          | 744                       | 0                           | 744                                     | 0.000   | 0.000  |
| AUG                  | 0                        | 0                        | 0  | 744               | 0                 | 0                 | 744                          | 744                       | 0                           | 744                                     | 0.000   | 0.000  |
| SEP                  | 0                        | 0                        | 0  | 720               | 0                 | 0                 | 720                          | 720                       | 0                           | 720                                     | 0.000   | 2.717  |
| OCT                  | 0                        | 41                       | 0  | 703               | 720               | 0                 | 744                          | 24                        | 0                           | 703                                     | -0.339  | 2.717  |
| NOV                  | 0                        | 430                      | 0  | 290               | 720               | 0                 | 720                          | 0                         | 0                           | 290                                     | -20.816 | 2.751  |
| DEC                  | 0                        | 737                      | 0  | 7                 | 744               | 0                 | 744                          | 0                         | 0                           | 7                                       | -20.660 | 2.751  |
| ANNUAL               | 0                        | 3252                     | 0  | 5508              | 5424              | 0                 | 8760                         | 3336                      | 0                           | 5508                                    |         |  |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 16:55:40 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>145.192<br>288.456<br>15/20 | NATURAL-GAS<br>270.125<br>1204.209<br>15/ 8 |
|-----|--|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 129.863<br>286.758<br>4/21                 | 194.903<br>1186.046<br>3/ 8                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 141.078<br>282.793<br>4/11                 | 128.845<br>953.981<br>3/ 8                  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 132.535<br>279.351<br>5/ 9                 | 23.814<br>521.994<br>5/ 8                   |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 162.462<br>476.635<br>31/18                | 4.069<br>53.756<br>5/ 8                     |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 199.632<br>477.145<br>28/18                | 0.000<br>0.000<br>30/ 1                     |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 220.952<br>515.354<br>23/18                | 0.000<br>0.000<br>31/ 1                     |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 223.532<br>505.508<br>21/19                | 0.000<br>0.000<br>31/ 1                     |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 181.666<br>488.107<br>5/18                 | 0.000<br>0.000<br>30/ 1                     |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 135.743<br>408.119<br>1/18                 | 14.829<br>454.105<br>20/ 8                  |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 132.884<br>282.740<br>12/11                | 90.806<br>869.880<br>3/ 8                   |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 144.830<br>288.368<br>9/20                 | 230.175<br>1142.743<br>13/ 8                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |  |   |
|     | ONE YEAR<br>USE/PEAK                             | 1950.369<br>515.354                        | 957.566<br>1204.209                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/17/1995 16:55:40 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 41.33       | 957.57      |
| SPACE COOL      | 334.82      | 0.00        |
| HVAC AUX        | 633.94      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 805.78      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 134.53      | 0.00        |
| TOTAL           | 1950.41     | 957.57      |

TOTAL SITE ENERGY 2907.93 MBTU 82.6 KBTU/SQFT-YR GROSS-AREA 83.3 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 6814.53 MBTU 193.5 KBTU/SQFT-YR GROSS-AREA 195.2 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 42.1  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.





INPUT SYSTEMS ..

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$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
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## \$ GENERAL PROJECT DATA

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TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #2 DDC CONTROL FOR BLDG. 7485      *
        LINE-5 *BOWLING ALLEY      * ..

ABORT      ERRORS      ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE  (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..
SD_S_HT_SR =DAY-SCHEDULE  (1,24) (75.8) ..
SD_S_CL_SR =DAY-SCHEDULE  (1,24) (76.) ..
SD_CL_PIN  =DAY-SCHEDULE  (1,24) (85.) ..
SD_HT_PIN  =DAY-SCHEDULE  (1,24) (55.) ..
SD_W_HT_SR =DAY-SCHEDULE  (1,24) (70.) ..
SD_W_CL_SR =DAY-SCHEDULE  (1,24) (70.2) ..
SD_S_HT_FS =DAY-SCHEDULE  (1,24) (75.8) ..
SD_S_CL_FS =DAY-SCHEDULE  (1,24) (76.) ..
SD_W_HT_FS =DAY-SCHEDULE  (1,24) (70.) ..
SD_W_CL_FS =DAY-SCHEDULE  (1,24) (70.2) ..
SD_FAN_SR  =DAY-SCHEDULE  (1,7) (0.)
                (8,24) (1.) ..
SD_FAN_FS  =DAY-SCHEDULE  (1,2) (1.)
                (3,7) (0.)
                (8,24) (1.) ..

SW_ON      =WEEK-SCHEDULE  (ALL) SD_ON ..

SW_OFF     =WEEK-SCHEDULE  (ALL) SD_OFF ..

SW_S_HT_F  =WEEK-SCHEDULE  (MON) SD_S_HT_SR
                (TUE) SD_S_HT_SR
                (WED) SD_S_HT_SR
                (THU) SD_S_HT_SR
                (FRI) SD_S_HT_FS
                (SAT) SD_S_HT_FS
                (SUN) SD_S_HT_SR
                (HOL) SD_S_HT_SR ..

SW_S_CL_F  =WEEK-SCHEDULE  (MON) SD_S_CL_SR

```

(TUE) SD\_S\_CL\_SR  
 (WED) SD\_S\_CL\_SR  
 (THU) SD\_S\_CL\_SR  
 (FRI) SD\_S\_CL\_FS  
 (SAT) SD\_S\_CL\_FS  
 (SUN) SD\_S\_CL\_SR  
 (HOL) SD\_S\_CL\_SR ..

SW\_CL\_PIN =WEEK-SCHEDULE (ALL) SD\_CL\_PIN ..

SW\_HT\_PIN =WEEK-SCHEDULE (ALL) SD\_HT\_PIN ..

SW\_W\_HT\_F =WEEK-SCHEDULE (MON) SD\_W\_HT\_SR  
 (TUE) SD\_W\_HT\_SR  
 (WED) SD\_W\_HT\_SR  
 (THU) SD\_W\_HT\_SR  
 (FRI) SD\_W\_HT\_FS  
 (SAT) SD\_W\_HT\_FS  
 (SUN) SD\_W\_HT\_SR  
 (HOL) SD\_W\_HT\_SR ..

SW\_W\_CL\_F =WEEK-SCHEDULE (MON) SD\_W\_CL\_SR  
 (TUE) SD\_W\_CL\_SR  
 (WED) SD\_W\_CL\_SR  
 (THU) SD\_W\_CL\_SR  
 (FRI) SD\_W\_CL\_FS  
 (SAT) SD\_W\_CL\_FS  
 (SUN) SD\_W\_CL\_SR  
 (HOL) SD\_W\_CL\_SR ..

SW\_FAN\_CYC =WEEK-SCHEDULE (ALL) SD\_ON ..

# \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

# \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

# \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

# \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

# \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
 THRU OCT 1 SW\_S\_HT\_F  
 THRU DEC 31 SW\_W\_HT\_F ..

# \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F

THRU OCT 15 SW\_S\_CL\_F  
THRU DEC 31 SW\_W\_CL\_F ..

\$ HEATING SET TEMP =55F  
S\_HTIN\_PIN =SCHEDULE THRU DEC 31 SW\_HT\_PIN ..

\$ COOLING SET TEMP =85F  
S\_CLIN\_PIN =SCHEDULE THRU DEC 31 SW\_CL\_PIN ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
THRU JAN 16 SW\_ON  
THRU AUG 19 SW\_OFF  
THRU AUG 21 SW\_ON  
THRU DEC 31 SW\_OFF ..

S\_FAN\_CYCL =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

# \$ ZONE DESCRIPTION

N\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 55.0 DESIGN-COOL-T = 85.0  
HEAT-TEMP-SCH = S\_HTIN\_PIN COOL-TEMP-SCH = S\_CLIN\_PIN  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 2200.  
SIZING-OPTION = FROM-LOADS  
HEATING-CAPACITY = -82200.0 ..

CR\_OLD\_SPA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

S\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

W\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

N\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 55.0 DESIGN-COOL-T = 85.0  
HEAT-TEMP-SCH = S\_HTIN\_PIN COOL-TEMP-SCH = S\_CLIN\_PIN  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 1630.  
SIZING-OPTION = FROM-LOADS  
HEATING-CAPACITY = -54800.0 ..

CR\_NEW\_SPC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED

THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

S\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

E\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

# \$ SYSTEM DESCRIPTION

OLD\_SYSTEM =SYSTEM SYSTEM-TYPE = DDS  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE-SCHED  
COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
OA-CONTROL = FIXED SUPPLY-CFM = 16000.  
RATED-CFM = 16000. MIN-OUTSIDE-AIR = 0.2  
MAX-OA-FRACTION = 0.2 FAN-SCHEDULE = S\_FAN\_CYCL  
SUPPLY-DELTA-T = 3.4 SUPPLY-KW = 0.00109  
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
MAX-FAN-RATIO = 1.0 NIGHT-CYCLE-CTRL = STAY-OFF  
NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 1.0  
COOLING-CAPACITY = 557000. COOL-SH-CAP = 354000.  
HEATING-CAPACITY = -640000.  
SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DIRECT  
ZONE-NAMES = (CR\_OLD\_SPA, S\_OLD\_SPAC, W\_OLD\_SPAC) ..

NEW\_SYSTEM =SYSTEM SYSTEM-TYPE = VAVS  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE-SCHED  
COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
COOL-CONTROL = WARMEST OA-CONTROL = FIXED  
SUPPLY-CFM = 10000. RATED-CFM = 10000.  
MIN-OUTSIDE-AIR = 0.2 MAX-OA-FRACTION = 0.2  
FAN-SCHEDULE = S\_FAN\_CYCL  
FAN-CONTROL = CONSTANT-VOLUME SUPPLY-DELTA-T = 3.4  
SUPPLY-KW = 0.00109  
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
MAX-FAN-RATIO = 1.0 NIGHT-CYCLE-CTRL = STAY-OFF  
NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 1.0  
REHEAT-DELTA-T = 65. COOLING-CAPACITY = 309000.  
COOL-SH-CAP = 232000. COOL-CTRL-RANGE = 2.  
HEATING-CAPACITY = -525000.  
SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DIRECT  
ZONE-NAMES = (CR\_NEW\_SPC, S\_NEW\_SPAC, E\_NEW\_SPAC) ..

UNIT-HEATR =SYSTEM SYSTEM-TYPE = UHT  
MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S\_HE-SCHED  
RATED-CFM = 4050. FAN-SCHEDULE = S\_HE-SCHED

SUPPLY-DELTA-T = 0.2 SUPPLY-KW = 0.00006  
 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  
 HEATING-CAPACITY = -137000.  
 ZONE-NAMES = (N\_OLD\_SPAC, N\_NEW\_SPAC) ..

## \$ HOURLY REPORT DESCRIPTION

BLOCK\_#1 =REPORT-BLOCK VARIABLE-TYPE = N\_OLD\_SPAC  
                                   VARIABLE-LIST = (17,18,7,6) ..  
 BLOCK\_#2 =REPORT-BLOCK VARIABLE-TYPE = S\_OLD\_SPAC  
                                   VARIABLE-LIST = (17,18,7,6) ..  
 AHU\_DD =REPORT-BLOCK VARIABLE-TYPE = OLD\_SYSTEM  
                                   VARIABLE-LIST = (1,2,3,4,5,6,17) ..  
 AHU\_VAV =REPORT-BLOCK VARIABLE-TYPE = NEW\_SYSTEM  
                                   VARIABLE-LIST = (1,2,3,4,5,6,17) ..  
 BLOCK\_#5 =REPORT-BLOCK VARIABLE-TYPE = N\_NEW\_SPAC  
                                   VARIABLE-LIST = (17,18,7,6) ..  
 BLOCK\_#6 =REPORT-BLOCK VARIABLE-TYPE = S\_NEW\_SPAC  
                                   VARIABLE-LIST = (17,18,7,6) ..  
 OLD\_ZONES = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                                   REPORT-BLOCK = (BLOCK\_#1,BLOCK\_#2)  
 ..  
 NEW\_ZONES = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                                   REPORT-BLOCK = (BLOCK\_#5,BLOCK\_#6)  
 ..  
 DD\_RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                                   REPORT-BLOCK = (AHU\_DD)  
 ..  
 VAV\_RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
                                   REPORT-BLOCK = (AHU\_VAV)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #2 DDC CONTROL FOR BLDG. 7485 \*  
 LINE-5 \*BOWLING ALLEY \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
                   SUMMARY=(PS-B,BEPS)  
                   HOURLY-DATA-SAVE = YES ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 8:13:58 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR OLD\_SYSTEM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |   |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | MAXIMUM<br>ELEC-<br>TRICAL<br>ENERGY<br>(KWH) |
| JAN   | 0.00000                     |                         |                      |                      | -81.214                     | 15                      | -7.F                 | -8.F                 | -332.252                                | 25782.  |
| FEB   | 0.00000                     |                         |                      |                      | -52.159                     | 3                       | -5.F                 | -6.F                 | -299.281                                | 23218.  |
| MAR   | 0.00000                     |                         |                      |                      | -29.387                     | 3                       | 14.F                 | 12.F                 | -216.966                                | 25857.  |
| APR   | 0.00000                     |                         |                      |                      | -2.730                      | 5                       | 30.F                 | 27.F                 | -68.780                                 | 25125.  |
| MAY   | 49.92852                    | 16                      | 62.F                 | 59.F                 | -0.607                      | 1                       | 44.F                 | 41.F                 | -13.237                                 | 25601.  |
| JUN   | 118.02316                   | 24                      | 83.F                 | 74.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 25020.  |
| JUL   | 153.15526                   | 17                      | 88.F                 | 80.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 25707.  |
| AUG   | 148.44141                   | 20                      | 90.F                 | 75.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 25857.  |
| SEP   | 82.61338                    | 5                       | 90.F                 | 77.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 24945.  |
| OCT   | 2.16902                     | 1                       | 83.F                 | 68.F                 | -1.689                      | 20                      | 23.F                 | 22.F                 | -49.519                                 | 25654.  |
| NOV   | 0.00000                     |                         |                      |                      | -19.224                     | 3                       | 13.F                 | 12.F                 | -204.167                                | 24711.  |
| DEC   | 0.00000                     |                         |                      |                      | -65.118                     | 13                      | 2.F                  | 1.F                  | -278.203                                | 25835.  |
| TOTAL | 554.332                     |                         |                      |                      | -252.125                    |                         |                      |                      | -332.252                                | 303316.                                       |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   | 45.178  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 8:13:58 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR OLD\_SYSTEM TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |  |                   |                            |                            |                              |                           |                                      |  | --COINCIDENT LOADS--                           |  |
|--------|---------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |
| JAN    | 0                         | 744                      | 0  | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -35.582  | 42.228   |  |
| FEB    | 0                         | 672                      | 0  | 0                 | 672                        | 0                          | 672                          | 0                         | 0                                    | -32.947  | 42.228   |  |
| MAR    | 0                         | 744                      | 0  | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -33.921  | 42.228   |  |
| APR    | 0                         | 720                      | 0  | 0                 | 720                        | 0                          | 720                          | 0                         | 0                                    | -4.213   | 42.883   |  |
| MAY    | 370                       | 360                      | 0  | 14                | 360                        | 384                        | 744                          | 0                         | 14                                   | 0.000  | 17.440   |  |
| JUN    | 710                       | 0                        | 0  | 10                | 0                          | 720                        | 720                          | 0                         | 10                                   | 0.000  | 45.178   |  |
| JUL    | 744                       | 0                        | 0  | 1                 | 0                          | 744                        | 744                          | 0                         | 0                                    | 0.000  | 44.359   |  |
| AUG    | 743                       | 0                        | 0  | 1                 | 0                          | 744                        | 744                          | 0                         | 1                                    | 0.000  | 45.178   |  |
| SEP    | 588                       | 0                        | 0  | 132               | 0                          | 720                        | 720                          | 0                         | 132                                  | 0.000  | 44.359   |  |
| OCT    | 15                        | 720                      | 0  | 9                 | 720                        | 24                         | 744                          | 0                         | 9                                    | 0.000  | 44.359   |  |
| NOV    | 0                         | 720                      | 0  | 0                 | 720                        | 0                          | 720                          | 0                         | 0                                    | -72.568  | 42.228   |  |
| DEC    | 0                         | 744                      | 0  | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -66.344  | 43.539   |  |
| ANNUAL | 3170                      | 5424                     | 0  | 166               | 5424                       | 3336                       | 8760                         | 0                         | 166                                  |  |  |  |



| EMC ENGINEERS INC. 80227 RUN #2 DDC CONTROL FOR BLDG. 7485 |                       |  |                   |  |                |  |                |  |                                | DOE-2.1D 5/18/1995 8:13:58 SDL RUN 1 |  |                   |   |                |  |                |       |                                |                           |        |                |
|--|-----------------------|--|-------------------|--|----------------|--|----------------|--|--------------------------------|--------------------------------------|--|-------------------|---|----------------|--|----------------|-------|--------------------------------|---------------------------|--------|----------------|
| DENVER, CO SYSTEM MONTHLY LOADS SUMMARY FOR                |                       |  |                   |  |                |  |                |  |                                | BOWLING ALLEY TOPEKA, KS             |  |                   |   |                |  |                |       |                                |                           |        |                |
| REPORT- SS-A   |                       |  |                   |  |                |  |                |  |                                | UNIT-HEATR                           |  |                   |   |                |  |                |       |                                |                           |        |                |
| -- C O O L I N G --  |                       |  |                   |  |                |  |                |  |                                | H E A T I N G --                     |  |                   |   |                |  |                |       |                                |                           |        |                |
| MONTH  | COOLING ENERGY (MBTU) |  | TIME OF MAX DY HR |  | DRY- BULB TEMP |  | WET- BULB TEMP |  | MAXIMUM COOLING LOAD (KBTU/HR) | HEATING ENERGY (MBTU)                |  | TIME OF MAX DY HR |   | DRY- BULB TEMP |  | WET- BULB TEMP |       | MAXIMUM HEATING LOAD (KBTU/HR) | ELEC- TRICAL ENERGY (KWH) |        | ELEC LOAD (KW) |
|  |                       |  |                   |  |                |  |                |  |                                |                                      |  |                   |   |                |  |                |       |                                |                           |        |                |
| JAN  | 0.00000               |  |                   |  |                |  |                |  | 0.000                          | -19.801                              |  | 15                | 7 | -7.7.F         |  | -8.7.F         |       | -68.725                        |                           | 1384.  | 2.823          |
| FEB  | 0.00000               |  |                   |  |                |  |                |  | 0.000                          | -13.271                              |  | 3                 | 7 | -5.7.F         |  | -6.7.F         |       | -58.491                        |                           | 1235.  | 2.807          |
| MAR  | 0.00000               |  |                   |  |                |  |                |  | 0.000                          | -7.753                               |  | 4                 | 7 | 14.7.F         |  | 12.7.F         |       | -38.918                        |                           | 1375.  | 2.773          |
| APR  | 0.00000               |  |                   |  |                |  |                |  | 0.000                          | -0.717                               |  | 1                 | 6 | 54.7.F         |  | 50.7.F         |       | -18.313                        |                           | 1327.  | 2.741          |
| MAY  | 0.00000               |  |                   |  |                |  |                |  | 0.000                          | 0.000                                |  |                   |   |                |  |                | 0.000 |                                | 1333.                     | 2.717  |                |
| JUN  | 0.00000               |  |                   |  |                |  |                |  | 0.000                          | 0.000                                |  |                   |   |                |  |                | 0.000 |                                | 1318.                     | 2.717  |                |
| JUL  | 0.00000               |  |                   |  |                |  |                |  | 0.000                          | 0.000                                |  |                   |   |                |  |                | 0.000 |                                | 1341.                     | 2.717  |                |
| AUG  | 0.00000               |  |                   |  |                |  |                |  | 0.000                          | 0.000                                |  |                   |   |                |  |                | 0.000 |                                | 1363.                     | 2.717  |                |
| SEP  | 0.00000               |  |                   |  |                |  |                |  | 0.000                          | 0.000                                |  |                   |   |                |  |                | 0.000 |                                | 1307.                     | 2.717  |                |
| OCT  | 0.00000               |  |                   |  |                |  |                |  | 0.000                          | -0.404                               |  | 20                | 8 | 23.7.F         |  | 22.7.F         |       | -17.871                        |                           | 1337.  | 2.745          |
| NOV  | 0.00000               |  |                   |  |                |  |                |  | 0.000                          | -6.088                               |  | 3                 | 7 | 19.7.F         |  | 17.7.F         |       | -34.461                        |                           | 1294.  | 2.769          |
| DEC  | 0.00000               |  |                   |  |                |  |                |  | 0.000                          | -16.079                              |  | 15                | 7 | 11.7.F         |  | 9.7.F          |       | -59.484                        |                           | 1382.  | 2.804          |
| TOTAL  | 0.000                 |  |                   |  |                |  |                |  | 0.000                          | -64.113                              |  |                   |   |                |  |                |       | -68.725                        |                           | 15995. | 2.823          |
| MAX  |                       |  |                   |  |                |  |                |  |                                |                                      |  |                   |   |                |  |                |       |                                |                           |        |                |

| EMC ENGINEERS INC. 80227 RUN #2 DDC CONTROL FOR BLDG. 7485 |                    |      |                    |   |                                 |   |                |      |                      | DOE-2.1D 5/18/1995 8:13:58 SDL RUN 1 |                      |      |               |      |                     |   |                     |      |                             |         |  |       |                                    |  |
|--|--------------------|------|--------------------|---|---------------------------------|---|----------------|------|----------------------|--------------------------------------|----------------------|------|---------------|------|---------------------|---|---------------------|------|-----------------------------|---------|--|-------|------------------------------------|--|
| DENVER, CO SYSTEM MONTHLY LOAD HOURS FOR                   |                    |      |                    |   |                                 |   |                |      |                      | BOWLING ALLEY TOPEKA, KS             |                      |      |               |      |                     |   |                     |      |                             |         |  |       |                                    |  |
| REPORT- SS-C   |                    |      |                    |   |                                 |   |                |      |                      | UNIT-HEATR                           |                      |      |               |      |                     |   |                     |      |                             |         |  |       |                                    |  |
| -- N U M B E R O F H O U R S --                            |                    |      |                    |   |                                 |   |                |      |                      | --COINCIDENT LOADS--                 |                      |      |               |      |                     |   |                     |      |                             |         |  |       |                                    |  |
| MONTH  | HOURS COOLING LOAD |      | HOURS HEATING LOAD |   | HOURS COINCIDENT COOL-HEAT LOAD |   | HOURS FLOATING |      | HOURS HEATING AVAIL. |                                      | HOURS COOLING AVAIL. |      | HOURS FANS ON |      | HOURS FANS ON CYCLE |   | HOURS NIGHT VENTING |      | HOURS FLOATING WHEN FANS ON |         | HEATING LOAD AT COOLING PEAK (KBTU/HR) |       | ELECTRIC LOAD AT COOLING PEAK (KW) |  |
|  |                    |      |                    |   |                                 |   |                |      |                      |                                      |                      |      |               |      |                     |   |                     |      |                             |         |  |       |                                    |  |
| JAN  | 0                  | 740  | 0                  | 0 | 0                               | 0 | 4              | 744  | 0                    | 0                                    | 0                    | 744  | 744           | 0    | 0                   | 0 | 0                   | 0    | 4                           |         | -15.695                                | 2.743 |                                    |  |
| FEB  | 0                  | 663  | 0                  | 0 | 0                               | 0 | 9              | 672  | 0                    | 0                                    | 0                    | 672  | 744           | 0    | 0                   | 0 | 0                   | 0    | 9                           |         | -13.177                                | 2.738 |                                    |  |
| MAR  | 0                  | 546  | 0                  | 0 | 0                               | 0 | 198            | 744  | 0                    | 0                                    | 0                    | 744  | 744           | 0    | 0                   | 0 | 0                   | 198  |                             | -12.723 | 2.738                                  |       |                                    |  |
| APR  | 0                  | 95   | 0                  | 0 | 0                               | 0 | 625            | 720  | 0                    | 0                                    | 0                    | 720  | 744           | 0    | 0                   | 0 | 0                   | 625  |                             | 0.000   | 2.717                                  |       |                                    |  |
| MAY  | 0                  | 0    | 0                  | 0 | 0                               | 0 | 744            | 360  | 0                    | 0                                    | 0                    | 744  | 744           | 384  | 0                   | 0 | 0                   | 744  |                             | 0.000   | 0.000                                  |       |                                    |  |
| JUN  | 0                  | 0    | 0                  | 0 | 0                               | 0 | 720            | 0    | 0                    | 0                                    | 0                    | 720  | 744           | 720  | 0                   | 0 | 0                   | 720  |                             | 0.000   | 0.000                                  |       |                                    |  |
| JUL  | 0                  | 0    | 0                  | 0 | 0                               | 0 | 744            | 0    | 0                    | 0                                    | 0                    | 744  | 744           | 744  | 0                   | 0 | 0                   | 744  |                             | 0.000   | 0.000                                  |       |                                    |  |
| AUG  | 0                  | 0    | 0                  | 0 | 0                               | 0 | 744            | 0    | 0                    | 0                                    | 0                    | 744  | 744           | 744  | 0                   | 0 | 0                   | 744  |                             | 0.000   | 0.000                                  |       |                                    |  |
| SEP  | 0                  | 0    | 0                  | 0 | 0                               | 0 | 720            | 0    | 0                    | 0                                    | 0                    | 720  | 744           | 720  | 0                   | 0 | 0                   | 720  |                             | 0.000   | 2.717                                  |       |                                    |  |
| OCT  | 0                  | 41   | 0                  | 0 | 0                               | 0 | 703            | 720  | 0                    | 0                                    | 0                    | 744  | 744           | 24   | 0                   | 0 | 0                   | 703  |                             | -0.339  | 2.717                                  |       |                                    |  |
| NOV  | 0                  | 430  | 0                  | 0 | 0                               | 0 | 290            | 720  | 0                    | 0                                    | 0                    | 720  | 744           | 0    | 0                   | 0 | 0                   | 290  |                             | -20.816 | 2.751                                  |       |                                    |  |
| DEC  | 0                  | 737  | 0                  | 0 | 0                               | 0 | 7              | 744  | 0                    | 0                                    | 0                    | 744  | 744           | 0    | 0                   | 0 | 0                   | 7    |                             | -20.660 | 2.751                                  |       |                                    |  |
| ANNUAL   | 0                  | 3252 | 0                  | 0 | 0                               | 0 | 5508           | 5424 | 0                    | 0                                    | 0                    | 8760 | 8760          | 3336 | 0                   | 0 | 0                   | 5508 |                             |         |  |       |                                    |  |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 8:13:58 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>163.102<br>282.161<br>15/20 | NATURAL-GAS<br>271.749<br>886.407<br>15/ 7 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 163.102<br>282.161<br>15/20                | 271.749<br>886.407<br>15/ 7                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 146.213<br>279.751<br>4/21                 | 192.682<br>813.937<br>3/ 7                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 159.519<br>276.498<br>4/11                 | 123.014<br>621.867<br>4/ 7                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 150.703<br>269.933<br>5/ 9                 | 21.117<br>340.495<br>5/ 7                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 178.956<br>464.890<br>31/18                | 4.776<br>44.500<br>1/ 2                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 214.506<br>465.078<br>28/18                | 0.000<br>0.000<br>30/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 238.951<br>504.647<br>23/18                | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 241.447<br>494.551<br>21/19                | 0.000<br>0.000<br>31/ 1                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 195.091<br>478.460<br>5/18                 | 0.000<br>0.000<br>30/ 1                    |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 154.578<br>391.854<br>1/18                 | 13.661<br>288.664<br>20/ 7                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 151.120<br>275.484<br>2/21                 | 85.526<br>592.143<br>3/ 6                  |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 162.683<br>282.073<br>9/20                 | 228.001<br>764.776<br>13/ 7                |
|     | ONE YEAR<br>USE/PEAK                             | 2156.869<br>504.647                        | 940.526<br>886.407                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 8:13:58 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 38.07       | 940.54      |
| SPACE COOL      | 319.84      | 0.00        |
| HVAC AUX        | 858.71      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 805.78      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 134.53      | 0.00        |
| TOTAL           | 2156.93     | 940.54      |

TOTAL SITE ENERGY 3097.39 MBTU 88.0 KBTU/SQFT-YR GROSS-AREA 88.7 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 7417.61 MBTU 210.6 KBTU/SQFT-YR GROSS-AREA 212.4 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 41.7  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

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## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #3 ECONOMIZER FOR BLDG. 7485      *
        LINE-5 *BOWLING ALLEY      * ..

ABORT      ERRORS ..
DIAGNOSTIC      WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                  SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                  HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE  (1,24) (1.) ..
SD_OFF      =DAY-SCHEDULE  (1,24) (0.) ..
SD_S_HT_SR  =DAY-SCHEDULE  (1,7) (84.8)
                  (8,24) (71.8) ..
SD_S_CL_SR  =DAY-SCHEDULE  (1,7) (85.)
                  (8,24) (72.) ..
SD_CL_PIN   =DAY-SCHEDULE  (1,24) (85.) ..
SD_HT_PIN   =DAY-SCHEDULE  (1,24) (55.) ..
SD_W_HT_SR  =DAY-SCHEDULE  (1,7) (55.)
                  (8,24) (74.) ..
SD_W_CL_SR  =DAY-SCHEDULE  (1,7) (55.2)
                  (8,24) (74.2) ..
SD_S_HT_FS  =DAY-SCHEDULE  (1,2) (71.8)
                  (3,7) (84.8)
                  (8,24) (71.8) ..
SD_S_CL_FS  =DAY-SCHEDULE  (1,2) (72.)
                  (3,7) (85.)
                  (8,24) (72.) ..
SD_W_HT_FS  =DAY-SCHEDULE  (1,2) (74.)
                  (3,7) (55.)
                  (8,24) (74.) ..
SD_W_CL_FS  =DAY-SCHEDULE  (1,2) (74.2)
                  (3,7) (55.2)
                  (8,24) (74.2) ..
SD_FAN_SR   =DAY-SCHEDULE  (1,7) (0.)
                  (8,24) (1.) ..
SD_FAN_FS   =DAY-SCHEDULE  (1,2) (1.)
                  (3,7) (0.)
                  (8,24) (1.) ..

SW_ON      =WEEK-SCHEDULE  (ALL) SD_ON ..

```

SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..

SW\_S\_HT\_F =WEEK-SCHEDULE (MON) SD\_S\_HT\_SR  
(TUE) SD\_S\_HT\_SR  
(WED) SD\_S\_HT\_SR  
(THU) SD\_S\_HT\_SR  
(FRI) SD\_S\_HT\_FS  
(SAT) SD\_S\_HT\_FS  
(SUN) SD\_S\_HT\_SR  
(HOL) SD\_S\_HT\_SR ..

SW\_S\_CL\_F =WEEK-SCHEDULE (MON) SD\_S\_CL\_SR  
(TUE) SD\_S\_CL\_SR  
(WED) SD\_S\_CL\_SR  
(THU) SD\_S\_CL\_SR  
(FRI) SD\_S\_CL\_FS  
(SAT) SD\_S\_CL\_FS  
(SUN) SD\_S\_CL\_SR  
(HOL) SD\_S\_CL\_SR ..

SW\_CL\_PIN =WEEK-SCHEDULE (ALL) SD\_CL\_PIN ..

SW\_HT\_PIN =WEEK-SCHEDULE (ALL) SD\_HT\_PIN ..

SW\_W\_HT\_F =WEEK-SCHEDULE (MON) SD\_W\_HT\_SR  
(TUE) SD\_W\_HT\_SR  
(WED) SD\_W\_HT\_SR  
(THU) SD\_W\_HT\_SR  
(FRI) SD\_W\_HT\_FS  
(SAT) SD\_W\_HT\_FS  
(SUN) SD\_W\_HT\_SR  
(HOL) SD\_W\_HT\_SR ..

SW\_W\_CL\_F =WEEK-SCHEDULE (MON) SD\_W\_CL\_SR  
(TUE) SD\_W\_CL\_SR  
(WED) SD\_W\_CL\_SR  
(THU) SD\_W\_CL\_SR  
(FRI) SD\_W\_CL\_FS  
(SAT) SD\_W\_CL\_FS  
(SUN) SD\_W\_CL\_SR  
(HOL) SD\_W\_CL\_SR ..

SW\_FAN\_CYC =WEEK-SCHEDULE (MON) SD\_FAN\_SR  
(TUE) SD\_FAN\_SR  
(WED) SD\_FAN\_SR  
(THU) SD\_FAN\_SR  
(FRI) SD\_FAN\_FS  
(SAT) SD\_FAN\_FS  
(SUN) SD\_FAN\_SR  
(HOL) SD\_FAN\_SR ..

\$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

\$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

\$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
THRU OCT 1 SW\_OFF  
THRU DEC 31 SW\_ON ..

\$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
THRU OCT 1 SW\_ON  
THRU DEC 31 SW\_OFF ..

\$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_HT\_F  
THRU OCT 1 SW\_S\_HT\_F  
THRU DEC 31 SW\_W\_HT\_F ..

\$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_W\_CL\_F  
THRU OCT 15 SW\_S\_CL\_F  
THRU DEC 31 SW\_W\_CL\_F ..

\$ HEATING SET TEMP =55F

S\_HTIN\_PIN =SCHEDULE THRU DEC 31 SW\_HT\_PIN ..

\$ COOLING SET TEMP =85F

S\_CLIN\_PIN =SCHEDULE THRU DEC 31 SW\_CL\_PIN ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
THRU JAN 16 SW\_ON  
THRU AUG 19 SW\_OFF  
THRU AUG 21 SW\_ON  
THRU DEC 31 SW\_OFF ..

S\_FAN\_CYCL =SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

\$ ZONE DESCRIPTION

N\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 55.0 DESIGN-COOL-T = 85.0  
HEAT-TEMP-SCH = S\_HTIN\_PIN COOL-TEMP-SCH = S\_CLIN\_PIN  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 2200.  
SIZING-OPTION = FROM-LOADS  
HEATING-CAPACITY = -82200.0 ..

CR\_OLD\_SPA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

S\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED

THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

W\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..


N\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 55.0 DESIGN-COOL-T = 85.0  
HEAT-TEMP-SCH = S\_HTIN\_PIN COOL-TEMP-SCH = S\_CLIN\_PIN  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 1630.  
SIZING-OPTION = FROM-LOADS  
HEATING-CAPACITY = -54800.0 ..

CR\_NEW\_SPC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

S\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

E\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

# \$ SYSTEM DESCRIPTION

OLD\_SYSTEM =SYSTEM SYSTEM-TYPE = DDS  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE-SCHED  
COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
ECONO-LIMIT-T = 69.0 ECONO-LOW-LIMIT = 60.0   
SUPPLY-CFM = 16000. RATED-CFM = 16000.  
MIN-OUTSIDE-AIR = 0.2 FAN-SCHEDULE = S\_FAN\_CYCL  
SUPPLY-DELTA-T = 3.4 SUPPLY-KW = 0.00109  
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
MAX-FAN-RATIO = 1.0 NIGHT-CYCLE-CTRL = STAY-OFF  
NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 1.0  
COOLING-CAPACITY = 557000. COOL-SH-CAP = 354000.  
HEATING-CAPACITY = -640000.  
SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DIRECT  
ZONE-NAMES = (CR\_OLD\_SPA, S\_OLD\_SPAC, W\_OLD\_SPAC) ..

NEW\_SYSTEM =SYSTEM SYSTEM-TYPE = VAVS  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE-SCHED

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COOLING-SCHEDULE = S_CL_SCHED PREHEAT-T = 0.0
ECONO-LIMIT-T = 69.0 ECONO-LOW-LIMIT = 60.0
COOL-CONTROL = WARMEST SUPPLY-CFM = 10000.
RATED-CFM = 10000. MIN-OUTSIDE-AIR = 0.2
FAN-SCHEDULE = S_FAN_CYCL
FAN-CONTROL = CONSTANT-VOLUME SUPPLY-DELTA-T = 3.4
SUPPLY-KW = 0.00109
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
MAX-FAN-RATIO = 1.0 NIGHT-CYCLE-CTRL = STAY-OFF
NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 1.0
REHEAT-DELTA-T = 65. COOLING-CAPACITY = 309000.
COOL-SH-CAP = 232000. COOL-CTRL-RANGE = 2.
HEATING-CAPACITY = -525000.
SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DIRECT
ZONE-NAMES = (CR_NEW_SPC, S_NEW_SPC, E_NEW_SPC) ..

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```

UNIT-HEATR =SYSTEM SYSTEM-TYPE = UHT
MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S_HE-SCHED
RATED-CFM = 4050. FAN-SCHEDULE = S_HE-SCHED
SUPPLY-DELTA-T = 0.2 SUPPLY-KW = 0.00006
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY
HEATING-CAPACITY = -137000.
ZONE-NAMES = (N_OLD_SPAC, N_NEW_SPAC) ..

```

#### \$ HOURLY REPORT DESCRIPTION

```

BLOCK_#1 =REPORT-BLOCK VARIABLE-TYPE = N_OLD_SPAC
          VARIABLE-LIST = (17,18,7,6) ..
BLOCK_#2 =REPORT-BLOCK VARIABLE-TYPE = S_OLD_SPAC
          VARIABLE-LIST = (17,18,7,6) ..
AHU_DD   =REPORT-BLOCK VARIABLE-TYPE = OLD_SYSTEM
          VARIABLE-LIST = (1,2,3,4,5,6,17) ..
AHU_VAV  =REPORT-BLOCK VARIABLE-TYPE = NEW_SYSTEM
          VARIABLE-LIST = (1,2,3,4,5,6,17) ..
BLOCK_#5 =REPORT-BLOCK VARIABLE-TYPE = N_NEW_SPAC
          VARIABLE-LIST = (17,18,7,6) ..
BLOCK_#6 =REPORT-BLOCK VARIABLE-TYPE = S_NEW_SPAC
          VARIABLE-LIST = (17,18,7,6) ..
OLD_ZONES = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
            REPORT-BLOCK = (BLOCK_#1,BLOCK_#2)
..
NEW_ZONES = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
            REPORT-BLOCK = (BLOCK_#5,BLOCK_#6)
..
DD_RPT    = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
            REPORT-BLOCK = (AHU_DD)
..
VAV_RPT   = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
            REPORT-BLOCK = (AHU_VAV)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                            |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -78.270                     | 15                      | 8                    | -7.F                 | -441.163                                | 22311.                             | 45.178                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -51.837                     | 3                       | 8                    | -3.F                 | -433.768                                | 20079.                             | 45.178                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -34.956                     | 3                       | 8                    | 15.F                 | -344.690                                | 22351.                             | 45.178                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -11.451                     | 5                       | 8                    | 34.F                 | -189.563                                | 21812.                             | 45.178                          |
| MAY   | 42.06223                    | 31                      | 19                   | 84.F                 | 76.F                                    | -2.801                      | 9                       | 10                   | 62.F                 | -94.896                                 | 22096.                             | 45.178                          |
| JUN   | 117.46651                   | 5                       | 8                    | 68.F                 | 65.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 21636.                             | 45.178                          |
| JUL   | 158.85899                   | 17                      | 19                   | 88.F                 | 80.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 22271.                             | 45.178                          |
| AUG   | 153.06587                   | 20                      | 20                   | 90.F                 | 75.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 22351.                             | 45.178                          |
| SEP   | 78.47227                    | 5                       | 18                   | 90.F                 | 77.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 21596.                             | 45.178                          |
| OCT   | 1.72823                     | 1                       | 18                   | 83.F                 | 68.F                                    | -5.721                      | 2                       | 10                   | 64.F                 | -143.197                                | 22183.                             | 45.178                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -27.856                     | 3                       | 8                    | 24.F                 | -310.552                                | 21293.                             | 45.178                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -64.397                     | 13                      | 8                    | 0.F                  | -420.592                                | 22399.                             | 45.178                          |
| TOTAL | 551.654                     |                         |                      |                      |   | -277.286                    |                         |                      |                      |   | 262392.                            | 45.178                          |
| MAX   |                             |                         |                      |                      | 451.006                                 |                             |                         |                      |                      | -441.163                                |                                    |                                 |

|        | HOURS   | HOURS   | HOURS     | N U M B E R | O F  | H O U R S | HOURS   | HOURS   | HOURS    | HOURS      | FLOATING | C O I N C I D E N T             | HOURS             | --COINCIDENT LOADS-- |
|--------|---------|---------|-----------|-------------|------|-----------|---------|---------|----------|------------|----------|---------------------------------|-------------------|----------------------|
| MONTH  | COOLING | HEATING | COOL-HEAT |             |      |           | COOLING | HEATING | COOLING  | VENTING    | WHEN     | LOAD AT                         | PEAK              | ELECTRIC             |
|        | LOAD    | LOAD    | LOAD      |             |      |           | AVAIL.  | AVAIL.  | ON CYCLE | ON VENTING | FANS ON  | LOAD AT COOLING PEAK (KBTU/HR.) | COOLING PEAK (KW) |                      |
| JAN    | 0       | 545     | 0         | 199         | 744  | 0         | 545     | 0       | 0        | 0          | 0        | -66.373                         | 42.228            |                      |
| FEB    | 0       | 492     | 0         | 180         | 672  | 0         | 492     | 0       | 0        | 0          | 0        | -63.889                         | 42.228            |                      |
| MAR    | 0       | 543     | 0         | 201         | 744  | 0         | 543     | 0       | 0        | 0          | 0        | -63.985                         | 42.228            |                      |
| APR    | 0       | 530     | 0         | 190         | 720  | 0         | 530     | 0       | 0        | 0          | 0        | -2.664                          | 42.883            |                      |
| MAY    | 202     | 263     | 0         | 279         | 360  | 384       | 543     | 0       | 0        | 0          | 78       | 0.000                           | 43.539            |                      |
| JUN    | 457     | 0       | 0         | 263         | 0    | 720       | 526     | 0       | 0        | 0          | 69       | 0.000                           | 17.440            |                      |
| JUL    | 534     | 0       | 0         | 210         | 744  | 744       | 547     | 0       | 0        | 0          | 13       | 0.000                           | 44.359            |                      |
| AUG    | 527     | 0       | 0         | 217         | 0    | 744       | 543     | 0       | 0        | 0          | 16       | 0.000                           | 45.178            |                      |
| SEP    | 399     | 0       | 0         | 321         | 0    | 720       | 528     | 0       | 0        | 0          | 129      | 0.000                           | 44.359            |                      |
| OCT    | 10      | 526     | 0         | 208         | 720  | 24        | 545     | 0       | 0        | 0          | 9        | 0.000                           | 44.359            |                      |
| NOV    | 196     | 524     | 0         | 190         | 720  | 0         | 524     | 0       | 0        | 0          | 0        | -102.523                        | 42.228            |                      |
| DEC    | 0       | 547     | 0         | 197         | 744  | 0         | 547     | 0       | 0        | 0          | 0        | -95.311                         | 43.539            |                      |
| ANNUAL | 2129    | 3970    | 0         | 2661        | 5424 | 3336      | 6413    | 0       | 0        | 0          | 314      |                                 |                   |                      |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 9:43:41 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR NEW SYSTEM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                           |                      |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|----------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | ELEC<br>LOAD<br>(KW) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -81.085                     | 15                      | -6.F                 | -7.F                 | -448.682                                | 15210.                    | 29.532               |                                 |
| FEB   | 0.00000                     |                         |                      |                      | -58.036                     | 3                       | -2.F                 | -3.F                 | -447.128                                | 13682.                    | 29.532               |                                 |
| MAR   | 0.00000                     |                         |                      |                      | -41.151                     | 3                       | 15.F                 | 12.F                 | -346.072                                | 15263.                    | 29.532               |                                 |
| APR   | 0.00000                     |                         |                      |                      | -11.031                     | 5                       | 34.F                 | 30.F                 | -224.726                                | 14870.                    | 29.532               |                                 |
| MAY   | 35.13863                    | 30                      | 82.F                 | 75.F                 | -2.011                      | 9                       | 50.F                 | 49.F                 | -101.034                                | 15058.                    | 29.532               |                                 |
| JUN   | 94.22874                    | 24                      | 83.F                 | 74.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 14770.                    | 29.532               |                                 |
| JUL   | 124.20753                   | 17                      | 88.F                 | 80.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 15157.                    | 29.532               |                                 |
| AUG   | 120.34452                   | 20                      | 87.F                 | 75.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 15263.                    | 29.532               |                                 |
| SEP   | 68.99541                    | 5                       | 90.F                 | 77.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 14717.                    | 29.532               |                                 |
| OCT   | 1.95892                     | 1                       | 83.F                 | 68.F                 | -5.883                      | 20                      | 23.F                 | 22.F                 | -225.442                                | 15108.                    | 29.532               |                                 |
| NOV   | 0.00000                     |                         |                      |                      | -29.008                     | 3                       | 24.F                 | 21.F                 | -304.499                                | 14515.                    | 29.532               |                                 |
| DEC   | 0.00000                     |                         |                      |                      | -67.884                     | 13                      | 0.F                  | -1.F                 | -421.684                                | 15260.                    | 29.532               |                                 |
| TOTAL | 444.874                     |                         |                      |                      | -296.089                    |                         |                      |                      | -448.682                                | 178868.                   |                      | 29.532                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                      |                                 |

H19-51

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 9:43:41 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR NEW SYSTEM TOPEKA, KS

| MONTH  | HOURS           |                 |                   |          | HOURS             |                   |         |         | HOURS   |       |          |                                       | COINCIDENT LOADS--                    |  |                            |                            |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|---------|---------|---------|-------|----------|---------------------------------------|---------------------------------------|--|----------------------------|----------------------------|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | VENTING | FANS ON | NIGHT | FLOTTING | HEATING<br>LOAD AT<br>COOLING<br>PEAK | HEATING<br>LOAD AT<br>COOLING<br>PEAK | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK | LOAD AT<br>COOLING<br>PEAK | LOAD AT<br>COOLING<br>PEAK |
| JAN    | 0               | 545             | 0                 | 199      | 744               | 0                 | 545     | 0       | 0       | 0     | 0        | -87.915                               | -87.915                               | 29.532                                 | 29.532                     | 29.532                     |
| FEB    | 0               | 492             | 0                 | 180      | 672               | 0                 | 492     | 0       | 0       | 0     | 0        | -94.261                               | -94.261                               | 29.532                                 | 29.532                     | 29.532                     |
| MAR    | 0               | 543             | 0                 | 201      | 744               | 0                 | 543     | 0       | 0       | 0     | 0        | -92.486                               | -92.486                               | 29.532                                 | 29.532                     | 29.532                     |
| APR    | 0               | 389             | 0                 | 331      | 720               | 0                 | 530     | 0       | 0       | 0     | 141      | -2.382                                | -2.382                                | 29.532                                 | 29.532                     | 29.532                     |
| MAY    | 239             | 138             | 0                 | 367      | 360               | 384               | 543     | 0       | 0       | 0     | 166      | 0.000                                 | 0.000                                 | 29.532                                 | 29.532                     | 29.532                     |
| JUN    | 502             | 0               | 0                 | 218      | 0                 | 720               | 526     | 0       | 0       | 0     | 24       | 0.000                                 | 0.000                                 | 29.532                                 | 29.532                     | 29.532                     |
| JUL    | 545             | 0               | 0                 | 199      | 0                 | 744               | 547     | 0       | 0       | 0     | 2        | 0.000                                 | 0.000                                 | 29.532                                 | 29.532                     | 29.532                     |
| AUG    | 539             | 0               | 0                 | 205      | 0                 | 744               | 543     | 0       | 0       | 0     | 4        | 0.000                                 | 0.000                                 | 29.532                                 | 29.532                     | 29.532                     |
| SEP    | 488             | 0               | 0                 | 232      | 0                 | 720               | 528     | 0       | 0       | 0     | 40       | 0.000                                 | 0.000                                 | 29.532                                 | 29.532                     | 29.532                     |
| OCT    | 17              | 310             | 0                 | 417      | 720               | 24                | 545     | 0       | 0       | 0     | 218      | 0.000                                 | 0.000                                 | 29.532                                 | 29.532                     | 29.532                     |
| NOV    | 0               | 496             | 0                 | 224      | 720               | 0                 | 524     | 0       | 0       | 0     | 28       | -113.084                              | -113.084                              | 29.532                                 | 29.532                     | 29.532                     |
| DEC    | 0               | 547             | 0                 | 197      | 744               | 0                 | 547     | 0       | 0       | 0     | 0        | -106.681                              | -106.681                              | 29.532                                 | 29.532                     | 29.532                     |
| ANNUAL | 2330            | 3460            | 0                 | 2970     | 5424              | 3336              | 6413    | 0       | 0       | 0     | 623      |                                       |                                       |  |                            |                            |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 9:43:41 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR UNIT-HEATR TOPEKA, KS

| MONTH        | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                    |                                 |
|--------------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|              | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN          | 0.00000                     |                         |                      |                      | -19.801                     | 15                      | 7                    | -8.F                 | -68.725                                 | 1384.                              | 2.823                           |
| FEB          | 0.00000                     |                         |                      |                      | -13.271                     | 3                       | 7                    | -6.F                 | -58.491                                 | 1235.                              | 2.807                           |
| MAR          | 0.00000                     |                         |                      |                      | -7.753                      | 4                       | 7                    | 12.F                 | -38.918                                 | 1375.                              | 2.773                           |
| APR          | 0.00000                     |                         |                      |                      | -0.717                      | 1                       | 6                    | 50.F                 | -18.313                                 | 1327.                              | 2.741                           |
| MAY          | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1333.                              | 2.717                           |
| JUN          | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1318.                              | 2.717                           |
| JUL          | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1341.                              | 2.717                           |
| AUG          | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1363.                              | 2.717                           |
| SEP          | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 1307.                              | 2.717                           |
| OCT          | 0.00000                     |                         |                      |                      | -0.404                      | 20                      | 8                    | 22.F                 | -17.871                                 | 1337.                              | 2.745                           |
| NOV          | 0.00000                     |                         |                      |                      | -6.088                      | 3                       | 7                    | 17.F                 | -34.461                                 | 1294.                              | 2.769                           |
| DEC          | 0.00000                     |                         |                      |                      | -16.079                     | 15                      | 7                    | 9.F                  | -59.484                                 | 1382.                              | 2.804                           |
| TOTAL<br>MAX | 0.000                       |                         |                      |                      | -64.113                     |                         |                      |                      | -68.725                                 | 15995.                             | 2.823                           |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 9:43:41 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR UNIT-HEATR TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |                            |                   |                            |                            |                              |                           |                                      |  | --COINCIDENT LOADS--                           |  |
|--------|---------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |
| JAN    | 0                         | 740                      | 0                          | 4                 | 744                        | 0                          | 744                          | 0                         | 4                                    | -15.695  | 2.743  |  |
| FEB    | 0                         | 663                      | 0                          | 9                 | 672                        | 0                          | 672                          | 0                         | 9                                    | -13.177  | 2.738  |  |
| MAR    | 0                         | 546                      | 0                          | 198               | 744                        | 0                          | 744                          | 0                         | 198                                  | -12.723  | 2.738  |  |
| APR    | 0                         | 95                       | 0                          | 625               | 720                        | 0                          | 720                          | 0                         | 625                                  | 0.000  | 2.717  |  |
| MAY    | 0                         | 0                        | 0                          | 744               | 360                        | 0                          | 744                          | 384                       | 744                                  | 0.000  | 0.000  |  |
| JUN    | 0                         | 0                        | 0                          | 720               | 0                          | 0                          | 720                          | 720                       | 720                                  | 0.000  | 0.000  |  |
| JUL    | 0                         | 0                        | 0                          | 744               | 0                          | 0                          | 744                          | 744                       | 744                                  | 0.000  | 0.000  |  |
| AUG    | 0                         | 0                        | 0                          | 744               | 0                          | 0                          | 744                          | 744                       | 744                                  | 0.000  | 0.000  |  |
| SEP    | 0                         | 0                        | 0                          | 720               | 0                          | 0                          | 720                          | 720                       | 720                                  | 0.000  | 0.000  |  |
| OCT    | 0                         | 41                       | 0                          | 703               | 720                        | 0                          | 744                          | 24                        | 703                                  | -0.339   | 2.717  |  |
| NOV    | 0                         | 430                      | 0                          | 290               | 720                        | 0                          | 720                          | 0                         | 290                                  | -20.816  | 2.751  |  |
| DEC    | 0                         | 737                      | 0                          | 7                 | 744                        | 0                          | 744                          | 0                         | 7                                    | -20.660  | 2.751  |  |
| ANNUAL | 0                         | 3252                     | 0                          | 5508              | 5424                       | 0                          | 8760                         | 3336                      | 5508                                 |  |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 9:43:41 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY -<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>145.192<br>288.456<br>15/20 | NATURAL-GAS<br>270.125<br>1204.209<br>15/ 8 |
|-----|---|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 129.870<br>286.758<br>4/21                 | 195.082<br>1186.046<br>3/ 8                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 141.531<br>282.827<br>13/12                | 138.500<br>953.987<br>3/ 8                  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 133.617<br>279.351<br>5/10                 | 44.239<br>625.309<br>5/ 8                   |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 157.107<br>476.609<br>31/18                | 10.944<br>270.853<br>9/ 8                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 195.620<br>477.145<br>28/18                | 0.000<br>0.000<br>30/ 1                     |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 220.077<br>515.352<br>23/18                | 0.000<br>0.000<br>31/ 1                     |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 222.174<br>505.507<br>21/19                | 0.000<br>0.000<br>31/ 1                     |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 175.620<br>488.083<br>5/18                 | 0.000<br>0.000<br>30/ 1                     |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 135.951<br>407.461<br>1/18                 | 25.844<br>549.663<br>20/ 8                  |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 133.702<br>282.740<br>12/11                | 107.074<br>872.909<br>3/ 8                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 144.831<br>288.368<br>9/20                 | 230.181<br>1142.743<br>13/ 8                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              |  |   |
|     | ONE YEAR<br>USE/PEAK                              | 1935.292<br>515.352                        | 1021.989<br>1204.209                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOB-2.1D 5/18/1995 9:43:41 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 44.65       | 1021.99     |
| SPACE COOL      | 316.43      | 0.00        |
| HVAC AUX        | 633.94      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 805.78      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 134.53      | 0.00        |
| TOTAL           | 1935.33     | 1021.99     |

TOTAL SITE ENERGY 2957.28 MBTU 84.0 KBTU/SQFT-YR GROSS-AREA 84.7 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 6833.68 MBTU 194.1 KBTU/SQFT-YR GROSS-AREA 195.7 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 42.1  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

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        LINE-4 *RUN #4 NIGHT INFILTRATION FOR BLDG. 7485*

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```

        LINE-5 *BOWLING ALLEY * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC WARNINGS ..
SYSTEMS-REPORT VERIFICATION=(SV-A)
              SUMMARY=(SS-A,SS-C,SS-K,SS-O)
              HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
SD_S_HT_F  =DAY-SCHEDULE (1,24) (71.8) ..
SD_S_CL_F  =DAY-SCHEDULE (1,24) (72.) ..
SD_CL_PIN  =DAY-SCHEDULE (1,24) (85.) ..
SD_HT_PIN  =DAY-SCHEDULE (1,24) (55.) ..
SD_W_HT_F  =DAY-SCHEDULE (1,24) (74.) ..
SD_W_CL_F  =DAY-SCHEDULE (1,24) (74.2) ..
S_OA%_SNTR =DAY-SCHEDULE (1,7) (0.)
              (8,24) (0.2) ..
S_OA%_FRSA =DAY-SCHEDULE (1,2) (0.2)
              (3,7) (0.)
              (8,24) (0.2) ..

```



```

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..
SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..
SW_S_HT_F  =WEEK-SCHEDULE (ALL) SD_S_HT_F ..
SW_S_CL_F  =WEEK-SCHEDULE (ALL) SD_S_CL_F ..
SW_CL_PIN  =WEEK-SCHEDULE (ALL) SD_CL_PIN ..
SW_HT_PIN  =WEEK-SCHEDULE (ALL) SD_HT_PIN ..
SW_W_HT_F  =WEEK-SCHEDULE (ALL) SD_W_HT_F ..
SW_W_CL_F  =WEEK-SCHEDULE (ALL) SD_W_CL_F ..
SW_OA%     =WEEK-SCHEDULE (MON) S_OA%_SNTR
              (TUE) S_OA%_SNTR

```

```

(WED) S_OA%_SNTR
(THU) S_OA%_SNTR
(FRI) S_OA%_FRSA
(SAT) S_OA%_FRSA
(SUN) S_OA%_SNTR
(HOL) S_OA%_SNTR ..

```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON  ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..
```

## \$ HEATING SEASON

```
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON  ..
```

## \$ COOLING SEASON

```
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF  ..
```

## \$ HEATING SET TEMP

```
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_W_HT_F
              THRU OCT  1 SW_S_HT_F
              THRU DEC 31 SW_W_HT_F  ..
```

## \$ COOLING SET TEMP

```
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_W_CL_F
              THRU OCT 15 SW_S_CL_F
              THRU DEC 31 SW_W_CL_F  ..
```

## \$ HEATING SET TEMP =55F

```
S_HTIN_PIN =SCHEDULE THRU DEC 31 SW_HT_PIN  ..
```

## \$ COOLING SET TEMP =85F

```
S_CLIN_PIN =SCHEDULE THRU DEC 31 SW_CL_PIN  ..
```

```
S_HRLY-RPT =SCHEDULE THRU JAN 13 SW_OFF
              THRU JAN 15 SW_ON
              THRU AUG 20 SW_OFF
              THRU AUG 22 SW_ON
              THRU DEC 31 SW_OFF  ..
```

```
S_OA%      =SCHEDULE THRU DEC 31 SW_OA%  ..
```

## \$ ZONE DESCRIPTION

```
N_OLD_SPAC =ZONE  DESIGN-HEAT-T = 55.0  DESIGN-COOL-T = 85.0
                  HEAT-TEMP-SCH = S_HTIN_PIN  COOL-TEMP-SCH = S_CLIN_PIN
                  ZONE-TYPE = CONDITIONED
                  THERMOSTAT-TYPE = PROPORTIONAL  ASSIGNED-CFM = 2200.
```

SIZING-OPTION = FROM-LOADS

HEATING-CAPACITY = -82200.0 ..

CR\_OLD\_SPA =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

S\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

W\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..


N\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 55.0 DESIGN-COOL-T = 85.0  
 HEAT-TEMP-SCH = S\_HTIN\_PIN COOL-TEMP-SCH = S\_CLIN\_PIN  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 1630.  
 SIZING-OPTION = FROM-LOADS  
 HEATING-CAPACITY = -54800.0 ..

CR\_NEW\_SPC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

S\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

E\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

OLD\_SYSTEM =SYSTEM SYSTEM-TYPE = DDS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 OA-CONTROL = FIXED SUPPLY-CFM = 16000.  
 RATED-CFM = 16000. MIN-AIR-SCH = S\_OA%   
 MAX-OA-FRACTION = 0.2 SUPPLY-DELTA-T = 3.4

```

SUPPLY-KW = 0.00109
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
MAX-FAN-RATIO = 1.0 NIGHT-CYCLE-CTRL = STAY-OFF
NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 1.0
COOLING-CAPACITY = 557000. COOL-SH-CAP = 354000.
HEATING-CAPACITY = -640000.
SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DIRECT
ZONE-NAMES = (CR_OLD_SPA, S_OLD_SPAC, W_OLD_SPAC) ..

```

```

NEW_SYSTEM =SYSTEM  SYSTEM-TYPE = VAVS
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0
HEATING-SCHEDULE = S_HE-SCHED
COOLING-SCHEDULE = S_CL_SCHED PREHEAT-T = 0.0
COOL-CONTROL = WARMEST OA-CONTROL = FIXED
SUPPLY-CFM = 10000. RATED-CFM = 10000.
MIN-AIR-SCH = S_OA% MAX-OA-FRACTION = 0.2 ←
FAN-CONTROL = CONSTANT-VOLUME SUPPLY-DELTA-T = 3.4
SUPPLY-KW = 0.00109
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
MAX-FAN-RATIO = 1.0 NIGHT-CYCLE-CTRL = STAY-OFF
NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 1.0
REHEAT-DELTA-T = 65. COOLING-CAPACITY = 309000.
COOL-SH-CAP = 232000. COOL-CTRL-RANGE = 2.
HEATING-CAPACITY = -525000.
SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DIRECT
ZONE-NAMES = (CR_NEW_SPC, S_NEW_SPAC, E_NEW_SPAC) ..

```

```

UNIT-HEATR =SYSTEM  SYSTEM-TYPE = UHT
MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S_HE-SCHED
RATED-CFM = 4050. FAN-SCHEDULE = S_HE-SCHED
SUPPLY-DELTA-T = 0.2 SUPPLY-KW = 0.00006
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY
HEATING-CAPACITY = -137000.
ZONE-NAMES = (N_OLD_SPAC, N_NEW_SPAC) ..

```

# \$ HOURLY REPORT DESCRIPTION

```

BLOCK_#1  =REPORT-BLOCK VARIABLE-TYPE = N_OLD_SPAC
          VARIABLE-LIST = (17,18,7,6) ..
BLOCK_#2  =REPORT-BLOCK VARIABLE-TYPE = S_OLD_SPAC
          VARIABLE-LIST = (17,18,7,6) ..
AHU_DD    =REPORT-BLOCK VARIABLE-TYPE = OLD_SYSTEM
          VARIABLE-LIST = (1,2,3,4,5,6,17) ..
AHU_VAV   =REPORT-BLOCK VARIABLE-TYPE = NEW_SYSTEM
          VARIABLE-LIST = (1,2,3,4,5,6,17) ..
BLOCK_#5  =REPORT-BLOCK VARIABLE-TYPE = N_NEW_SPAC
          VARIABLE-LIST = (17,18,7,6) ..
BLOCK_#6  =REPORT-BLOCK VARIABLE-TYPE = S_NEW_SPAC
          VARIABLE-LIST = (17,18,7,6) ..
OLD_ZONES = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (BLOCK_#1,BLOCK_#2)
..
NEW_ZONES = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
          REPORT-BLOCK = (BLOCK_#5,BLOCK_#6)
..

```



DD\_RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
REPORT-BLOCK = (AHU\_DD)

VAV\_RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
REPORT-BLOCK = (AHU\_VAV)

END ..

COMPUTE SYSTEMS ..

INPUT PLANT ..

\$-----\$  
\$ E Z - D O E P L A N T S I N P U T \$  
\$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #4 NIGHT INFILTRATION FOR BLDG. 7485\*

LINE-5 \*BOWLING ALLEY \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
PLANT-REPORT VERIFICATION=(PV-A)  
SUMMARY=(PS-B,BEPS)  
HOURLY-DATA-SAVE = YES ..

# \$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..

PD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

PW\_ON =WEEK-SCHEDULE (ALL) PD\_ON ..

PW\_OFF =WEEK-SCHEDULE (ALL) PD\_OFF ..

# \$ HEATING SEASON

P\_HEAT =SCHEDULE THRU MAY 15 PW\_ON  
THRU OCT 1 PW\_OFF  
THRU DEC 31 PW\_ON ..

# \$ COOLING SEASON

P\_COOL =SCHEDULE THRU MAY 15 PW\_OFF  
THRU OCT 1 PW\_ON  
THRU DEC 31 PW\_OFF ..

# \$ EQUIPMENT DESCRIPTION

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 10: 3:35 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. 7485BOWLING ALLEY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR OLD\_SYSTEM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                           |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -94.335                     | 15                      | 8                    | -7.F                 | -411.901                                | 25782.                    | 45.178                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -62.096                     | 3                       | 8                    | -2.F                 | -376.250                                | 23218.                    | 45.178                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -36.295                     | 3                       | 8                    | 15.F                 | -279.901                                | 25857.                    | 45.178                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -4.005                      | 1                       | 2                    | 34.F                 | -116.423                                | 25125.                    | 45.178                          |
| MAY   | 63.06487                    | 16                      | 2                    | 62.F                 | 59.F                                    | -0.610                      | 1                       | 8                    | 45.F                 | -26.868                                 | 25601.                    | 45.178                          |
| JUN   | 142.92651                   | 24                      | 20                   | 83.F                 | 74.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 25020.                    | 45.178                          |
| JUL   | 180.65172                   | 17                      | 19                   | 88.F                 | 80.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 25707.                    | 45.178                          |
| AUG   | 175.30405                   | 20                      | 20                   | 90.F                 | 75.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 25857.                    | 45.178                          |
| SEP   | 103.13426                   | 5                       | 18                   | 90.F                 | 77.F                                    | -2.509                      | 20                      | 9                    | 29.F                 | -82.495                                 | 24945.                    | 45.178                          |
| OCT   | 2.96771                     | 1                       | 18                   | 83.F                 | 68.F                                    | -25.384                     | 3                       | 8                    | 24.F                 | -237.279                                | 24711.                    | 45.178                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -77.537                     | 13                      | 8                    | 0.F                  | -358.219                                | 25835.                    | 45.178                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   |                             |                         |                      |                      |   |                           |                                 |
| TOTAL | 668.049                     |                         |                      |                      | 543.093                                 | -302.769                    |                         |                      |                      | -411.901                                | 303316.                   | 45.178                          |
| MAX   |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 10: 3:35 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. 7485BOWLING ALLEY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR OLD\_SYSTEM TOPEKA, KS

| MONTH  | HOURS           |                 |                   |          | HOURS             |                   |         |         | HOURS   |                  |                              |  | COINCIDENT LOADS                                   |  |  |  |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|---------|---------|---------|------------------|------------------------------|--|--|--|--|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | VENTING | FANS ON | FLOATING<br>WHEN | PEAK<br>COOLING<br>(KBTU/HR) | PEAK<br>ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) |
| JAN    | 0               | 744             | 0                 | 0        | 744               | 0                 | 744     | 0       | 0       | 0                | 0                            | 42.228   | -100.097   | -100.097   | -100.097   | -100.097   |
| FEB    | 0               | 672             | 0                 | 0        | 672               | 0                 | 672     | 0       | 0       | 0                | 0                            | 42.228   | -95.418  | -95.418  | -95.418  | -95.418  |
| MAR    | 0               | 744             | 0                 | 0        | 744               | 0                 | 744     | 0       | 0       | 0                | 0                            | 42.228   | -97.970  | -97.970  | -97.970  | -97.970  |
| APR    | 0               | 720             | 0                 | 0        | 720               | 0                 | 720     | 0       | 0       | 0                | 0                            | 42.883   | -5.106   | -5.106   | -5.106   | -5.106   |
| MAY    | 384             | 360             | 0                 | 0        | 360               | 384               | 720     | 0       | 0       | 0                | 0                            | 17.440   | 0.000  | 0.000  | 0.000  | 0.000  |
| JUN    | 719             | 0               | 0                 | 1        | 0                 | 720               | 744     | 0       | 0       | 0                | 0                            | 45.178   | 0.000  | 0.000  | 0.000  | 0.000  |
| JUL    | 744             | 0               | 0                 | 0        | 0                 | 744               | 744     | 0       | 0       | 0                | 0                            | 44.359   | 0.000  | 0.000  | 0.000  | 0.000  |
| AUG    | 744             | 0               | 0                 | 0        | 0                 | 744               | 744     | 0       | 0       | 0                | 0                            | 44.359   | 0.000  | 0.000  | 0.000  | 0.000  |
| SEP    | 643             | 0               | 0                 | 77       | 0                 | 720               | 720     | 0       | 0       | 0                | 0                            | 44.359   | 0.000  | 0.000  | 0.000  | 0.000  |
| OCT    | 21              | 720             | 0                 | 3        | 720               | 24                | 744     | 0       | 0       | 0                | 0                            | 44.359   | 0.000  | 0.000  | 0.000  | 0.000  |
| NOV    | 0               | 720             | 0                 | 0        | 720               | 0                 | 720     | 0       | 0       | 0                | 0                            | 42.228   | -142.979   | -142.979   | -142.979   | -142.979   |
| DEC    | 0               | 744             | 0                 | 0        | 744               | 0                 | 744     | 0       | 0       | 0                | 0                            | 43.539   | -132.023   | -132.023   | -132.023   | -132.023   |
| ANNUAL | 3255            | 5424            | 0                 | 81       | 5424              | 3336              | 8760    | 0       | 0       | 0                | 0                            | 81   |  |  |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 10: 3:35 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. 7485BOWLING ALLEY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR NEW\_SYSTEM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                           |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -78.147                     | 15                      | 8                    | -6.F                 | -7.F                                    | 17379.                    | 29.532                          |
| FEB   | 0.00000                     |                         |                      |                      | -54.905                     | 3                       | 8                    | -2.F                 | -3.F                                    | 15644.                    | 29.532                          |
| MAR   | 0.00000                     |                         |                      |                      | -35.519                     | 3                       | 8                    | 15.F                 | 12.F                                    | 17454.                    | 29.532                          |
| APR   | 0.00000                     |                         |                      |                      | -5.084                      | 5                       | 8                    | 34.F                 | 30.F                                    | 16941.                    | 29.532                          |
| MAY   | 45.54992                    | 16                      | 2                    | 62.F                 | 59.F                        | 1                       | 8                    | 45.F                 | 42.F                                    | 17249.                    | 29.532                          |
| JUN   | 106.77282                   | 24                      | 20                   | 83.F                 | 74.F                        |                         |                      |                      |   | 16885.                    | 29.532                          |
| JUL   | 134.64278                   | 17                      | 18                   | 88.F                 | 80.F                        |                         |                      |                      |   | 17305.                    | 29.532                          |
| AUG   | 132.73920                   | 20                      | 21                   | 87.F                 | 75.F                        |                         |                      |                      |   | 17454.                    | 29.532                          |
| SEP   | 81.98801                    | 5                       | 18                   | 90.F                 | 77.F                        |                         |                      |                      |   | 16810.                    | 29.532                          |
| OCT   | 2.49712                     | 1                       | 18                   | 83.F                 | 68.F                        | 20                      | 9                    | 29.F                 | 29.F                                    | 17277.                    | 29.532                          |
| NOV   | 0.00000                     |                         |                      |                      | -22.886                     | 3                       | 8                    | 24.F                 | 21.F                                    | 16652.                    | 29.532                          |
| DEC   | 0.00000                     |                         |                      |                      | -64.603                     | 13                      | 8                    | 0.F                  | -1.F                                    | 17407.                    | 29.532                          |
| TOTAL | 504.190                     |                         |                      |                      | -263.970                    |                         |                      |                      |   | 204455.                   |                                 |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                           | 29.532                          |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |
|       |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 10: 3:35 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. 7485BOWLING ALLEY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR NEW\_SYSTEM TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |                            |                   |                            |                            |                              |                           |                                      |  |  | --COINCIDENT LOADS-- |  |
|--------|---------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|----------------------|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |                      |  |
| JAN    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 0                            | 0                         | 0                                    | -80.375  | 29.532   |                      |  |
| FEB    | 0                         | 672                      | 0                          | 0                 | 672                        | 0                          | 0                            | 0                         | 0                                    | -81.733  | 29.532   |                      |  |
| MAR    | 0                         | 733                      | 0                          | 11                | 744                        | 0                          | 0                            | 0                         | 11                                   | -85.166  | 29.532   |                      |  |
| APR    | 0                         | 470                      | 0                          | 250               | 720                        | 0                          | 0                            | 0                         | 250                                  | -3.167   | 29.532   |                      |  |
| MAY    | 381                       | 183                      | 0                          | 180               | 360                        | 384                        | 0                            | 0                         | 180                                  | 0.000  | 10.900   |                      |  |
| JUN    | 718                       | 0                        | 0                          | 2                 | 0                          | 720                        | 0                            | 0                         | 2                                    | 0.000  | 29.532   |                      |  |
| JUL    | 744                       | 0                        | 0                          | 0                 | 0                          | 744                        | 0                            | 0                         | 0                                    | 0.000  | 29.532   |                      |  |
| AUG    | 744                       | 0                        | 0                          | 0                 | 0                          | 744                        | 0                            | 0                         | 0                                    | 0.000  | 29.532   |                      |  |
| SEP    | 705                       | 0                        | 0                          | 15                | 0                          | 720                        | 0                            | 0                         | 15                                   | 0.000  | 29.532   |                      |  |
| OCT    | 21                        | 438                      | 0                          | 285               | 720                        | 24                         | 0                            | 0                         | 285                                  | 0.000  | 29.532   |                      |  |
| NOV    | 0                         | 632                      | 0                          | 88                | 720                        | 0                          | 0                            | 0                         | 88                                   | -109.374   | 29.532   |                      |  |
| DEC    | 0                         | 744                      | 0                          | 0                 | 744                        | 0                          | 0                            | 0                         | 0                                    | -102.670   | 29.532   |                      |  |
| ANNUAL | 3313                      | 4616                     | 0                          | 831               | 5424                       | 3336                       | 8760                         | 0                         | 831                                  |  |  |                      |  |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 10: 3:35 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. 7485BOWLING ALLEY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR UNIT-HEATR TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -19.801                     | 15                      | 7                    | -7.F                 | -8.F                                    | 1384.                              | 2.823                           |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -13.271                     | 3                       | 7                    | -5.F                 | -6.F                                    | 1235.                              | 2.807                           |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -7.753                      | 4                       | 7                    | 14.F                 | 12.F                                    | 1375.                              | 2.773                           |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.717                      | 1                       | 6                    | 54.F                 | 50.F                                    | 1327.                              | 2.741                           |
| MAY   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1333.                              | 2.717                           |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1318.                              | 2.717                           |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1341.                              | 2.717                           |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1363.                              | 2.717                           |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                                   | 0.000                       |                         |                      |                      | 0.000                                   | 1307.                              | 2.717                           |
| OCT   | 0.00000                     |                         |                      |                      | 0.000                                   | -0.404                      | 20                      | 8                    | 23.F                 | 22.F                                    | 1337.                              | 2.745                           |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -6.088                      | 3                       | 7                    | 19.F                 | 17.F                                    | 1294.                              | 2.769                           |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -16.079                     | 15                      | 7                    | 11.F                 | 9.F                                     | 1382.                              | 2.804                           |
| TOTAL | 0.000                       |                         |                      |                      |   | -64.113                     |                         |                      |                      |   | 15995.                             |                                 |
| MAX   |                             |                         |                      |                      | 0.000                                   |                             |                         |                      |                      | -68.725                                 |                                    | 2.823                           |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 10: 3:35 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. 7485BOWLING ALLEY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR UNIT-HEATR TOPEKA, KS

| MONTH  | HOURS           |                 |                   |          | HOURS             |                   |         |                   | HOURS   |                   |         |                   | COINCIDENT LOADS--                    |  |      |      |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|---------|-------------------|---------|-------------------|---------|-------------------|---------------------------------------|--|------|------|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | HEATING<br>AVAIL. | FANS ON | COOLING<br>AVAIL. | FANS ON | HEATING<br>AVAIL. | HEATING<br>LOAD AT<br>COOLING<br>PEAK | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK | LOAD | LOAD |
| JAN    | 0               | 740             | 0                 | 4        | 744               | 0                 | 744     | 0                 | 744     | 0                 | 0       | 0                 | -15.695                               | 2.743                                  |      |      |
| FEB    | 0               | 663             | 0                 | 9        | 672               | 0                 | 672     | 0                 | 672     | 0                 | 0       | 0                 | -13.177                               | 2.738                                  |      |      |
| MAR    | 0               | 546             | 0                 | 198      | 744               | 0                 | 744     | 0                 | 744     | 0                 | 0       | 0                 | -12.723                               | 2.738                                  |      |      |
| APR    | 0               | 95              | 0                 | 625      | 720               | 0                 | 720     | 0                 | 720     | 0                 | 0       | 0                 | 0.000                                 | 2.717                                  |      |      |
| MAY    | 0               | 0               | 0                 | 744      | 360               | 0                 | 744     | 384               | 744     | 0                 | 0       | 0                 | 0.000                                 | 0.000                                  |      |      |
| JUN    | 0               | 0               | 0                 | 720      | 0                 | 0                 | 720     | 720               | 720     | 0                 | 0       | 0                 | 0.000                                 | 0.000                                  |      |      |
| JUL    | 0               | 0               | 0                 | 744      | 0                 | 0                 | 744     | 744               | 744     | 0                 | 0       | 0                 | 0.000                                 | 0.000                                  |      |      |
| AUG    | 0               | 0               | 0                 | 744      | 0                 | 0                 | 744     | 744               | 744     | 0                 | 0       | 0                 | 0.000                                 | 0.000                                  |      |      |
| SEP    | 0               | 0               | 0                 | 720      | 0                 | 0                 | 720     | 720               | 720     | 0                 | 0       | 0                 | 0.000                                 | 0.000                                  |      |      |
| OCT    | 0               | 41              | 0                 | 703      | 720               | 0                 | 744     | 24                | 744     | 0                 | 0       | 0                 | -0.339                                | 2.717                                  |      |      |
| NOV    | 0               | 430             | 0                 | 290      | 720               | 0                 | 744     | 0                 | 744     | 0                 | 0       | 0                 | -20.816                               | 2.751                                  |      |      |
| DEC    | 0               | 737             | 0                 | 7        | 744               | 0                 | 744     | 0                 | 744     | 0                 | 0       | 0                 | -20.660                               | 2.751                                  |      |      |
| ANNUAL | 0               | 3252            | 0                 | 5508     | 5424              | 0                 | 8760    | 3336              |         | 0                 | 0       | 0                 |                                       |  |      |      |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 10: 3:35 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. 7485BOWLING ALLEY  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR | ELECTRICITY<br>164.447<br>284.072<br>15/20 | NATURAL-GAS<br>286.002<br>982.884<br>15/ 8 |
|-----|--|--|--|
| JAN | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 147.409<br>283.942<br>4/20                 | 204.818<br>912.175<br>3/ 8                 |
| FEB | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 160.300<br>283.894<br>5/22                 | 130.520<br>706.301<br>3/ 8                 |
| MAR | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 150.950<br>275.416<br>1/ 1                 | 22.866<br>383.127<br>5/ 8                  |
| APR | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 186.215<br>489.249<br>31/18                | 5.074<br>75.002<br>1/ 8                    |
| MAY | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 227.119<br>488.467<br>28/18                | 0.000<br>0.000<br>30/ 1                    |
| JUN | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 251.023<br>532.616<br>23/18                | 0.000<br>0.000<br>31/ 1                    |
| JUL | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 254.099<br>517.022<br>21/19                | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 207.148<br>501.212<br>5/18                 | 0.000<br>0.000<br>30/ 1                    |
| SEP | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 155.326<br>416.984<br>1/18                 | 15.627<br>288.338<br>20/ 9                 |
| OCT | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 151.821<br>278.356<br>12/11                | 92.914<br>624.646<br>3/ 8                  |
| NOV | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             | 163.781<br>283.984<br>9/20                 | 241.896<br>870.975<br>13/ 8                |
| DEC | TOTAL(MBTU)<br>PEAK(KBTU)<br>DY/HR             |  |  |
|     | ONE YEAR<br>USE/PEAK                           | 2219.639<br>532.616                        | 999.717<br>982.884                         |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 10: 3:35 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION FOR BLDG. 7485BOWLING ALLEY  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE  | ELECTRICITY  | NATURAL-GAS                   |
|--|--------------|-------------------------------|
| IN SITE MBTU -   |              |                               |
| CATEGORY OF USE  |              |                               |
| SPACE HEAT   | 42.64        | 999.70                        |
| SPACE COOL   | 376.89       | 0.00                          |
| HVAC AUX   | 859.86       | 0.00                          |
| DOM HOT WTR  | 0.00         | 0.00                          |
| AUX SOLAR  | 0.00         | 0.00                          |
| LIGHTS   | 805.78       | 0.00                          |
| VERT TRANS   | 0.00         | 0.00                          |
| MISC EQUIP   | 134.53       | 0.00                          |
| TOTAL  | 2219.71      | 999.70                        |
| TOTAL SITE ENERGY  | 3219.36 MBTU | 91.4 KBTU/SQFT-YR GROSS-AREA  |
| TOTAL SOURCE ENERGY  | 7665.30 MBTU | 217.7 KBTU/SQFT-YR GROSS-AREA |
| PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 41.8            |              |                               |
| PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED                                  |              |                               |
| NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED |              |                               |
| ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.           |              |                               |

INPUT SYSTEMS ..

```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *   EMC       ENGINEERS       INC.       *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *   DENVER,       CO       80227       *

```

```

        LINE-4 *RUN #5 DAY INFILTRATION FOR BLDG. 7485 *
        LINE-5 *BOWLING ALLEY                        * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE  (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..
SD_S_HT_F  =DAY-SCHEDULE  (1,24) (71.8) ..
SD_S_CL_F  =DAY-SCHEDULE  (1,24) (72.) ..
SD_CL_PIN  =DAY-SCHEDULE  (1,24) (85.) ..
SD_HT_PIN  =DAY-SCHEDULE  (1,24) (55.) ..
SD_W_HT_F  =DAY-SCHEDULE  (1,24) (74.) ..
SD_W_CL_F  =DAY-SCHEDULE  (1,24) (74.2) ..
S_OA%_SNTR =DAY-SCHEDULE  (1,7) (0.2)
                (8,24) (0.) ..
S_OA%_FRSA =DAY-SCHEDULE  (1,2) (0.)
                (3,7) (0.2)
                (8,24) (0.) ..

```



```

SW_ON      =WEEK-SCHEDULE  (ALL) SD_ON ..
SW_OFF     =WEEK-SCHEDULE  (ALL) SD_OFF ..
SW_S_HT_F  =WEEK-SCHEDULE  (ALL) SD_S_HT_F ..
SW_S_CL_F  =WEEK-SCHEDULE  (ALL) SD_S_CL_F ..
SW_CL_PIN  =WEEK-SCHEDULE  (ALL) SD_CL_PIN ..
SW_HT_PIN  =WEEK-SCHEDULE  (ALL) SD_HT_PIN ..
SW_W_HT_F  =WEEK-SCHEDULE  (ALL) SD_W_HT_F ..
SW_W_CL_F  =WEEK-SCHEDULE  (ALL) SD_W_CL_F ..
SW_OA%     =WEEK-SCHEDULE  (MON) S_OA%_SNTR
                (TUE) S_OA%_SNTR

```

```

(WED) S_OA%_SNTR
(THU) S_OA%_SNTR
(FRI) S_OA%_FRSA
(SAT) S_OA%_FRSA
(SUN) S_OA%_SNTR
(HOL) S_OA%_SNTR ..

```

## \$ FULL ON SYSTEM

```
S_ON      =SCHEDULE THRU DEC 31 SW_ON  ..
```

## \$ FULL OFF SYSTEM

```
S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..
```

## \$ HEATING SEASON

```
S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON  ..
```

## \$ COOLING SEASON

```
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF  ..
```

## \$ HEATING SET TEMP

```
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_W_HT_F
              THRU OCT  1 SW_S_HT_F
              THRU DEC 31 SW_W_HT_F  ..
```

## \$ COOLING SET TEMP

```
S_CL_SET_F =SCHEDULE THRU MAY 15 SW_W_CL_F
              THRU OCT 15 SW_S_CL_F
              THRU DEC 31 SW_W_CL_F  ..
```

## \$ HEATING SET TEMP =55F

```
S_HTIN_PIN =SCHEDULE THRU DEC 31 SW_HT_PIN  ..
```

## \$ COOLING SET TEMP =85F

```
S_CLIN_PIN =SCHEDULE THRU DEC 31 SW_CL_PIN  ..
```

```
S_HRLY-RPT =SCHEDULE THRU JAN 13 SW_OFF
              THRU JAN 15 SW_ON
              THRU AUG 20 SW_OFF
              THRU AUG 22 SW_ON
              THRU DEC 31 SW_OFF  ..
```

```
S_OA%      =SCHEDULE THRU DEC 31 SW_OA%  ..
```

## \$ ZONE DESCRIPTION

```
N_OLD_SPAC =ZONE  DESIGN-HEAT-T = 55.0  DESIGN-COOL-T = 85.0
                  HEAT-TEMP-SCH = S_HTIN_PIN  COOL-TEMP-SCH = S_CLIN_PIN
                  ZONE-TYPE = CONDITIONED
                  THERMOSTAT-TYPE = PROPORTIONAL  ASSIGNED-CFM = 2200.
```



SIZING-OPTION = FROM-LOADS  
HEATING-CAPACITY = -82200.0 ..

CR\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

S\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

W\_OLD\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

N\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 55.0 DESIGN-COOL-T = 85.0  
HEAT-TEMP-SCH = S\_HTIN\_PIN COOL-TEMP-SCH = S\_CLIN\_PIN  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL ASSIGNED-CFM = 1630.  
SIZING-OPTION = FROM-LOADS  
HEATING-CAPACITY = -54800.0 ..

CR\_NEW\_SPC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

S\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

E\_NEW\_SPAC =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

#### \$ SYSTEM DESCRIPTION

OLD\_SYSTEM =SYSTEM SYSTEM-TYPE = DDS  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE-SCHED  
COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
OA-CONTROL = FIXED SUPPLY-CFM = 16000.  
RATED-CFM = 16000. MIN-AIR-SCH = S OA4  
MAX-OA-FRACTION = 0.2 SUPPLY-DELTA-T = 3.4

```

SUPPLY-KW = 0.00109
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
MAX-FAN-RATIO = 1.0 NIGHT-CYCLE-CTRL = STAY-OFF
NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 1.0
COOLING-CAPACITY = 557000. COOL-SH-CAP = 354000.
HEATING-CAPACITY = -640000.
SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DIRECT
ZONE-NAMES = (CR_OLD_SPA, S_OLD_SPAC, W_OLD_SPAC) ..

```

```

NEW_SYSTEM =SYSTEM  SYSTEM-TYPE = VAVS
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0
HEATING-SCHEDULE = S_HE-SCHED
COOLING-SCHEDULE = S_CL_SCHED PREHEAT-T = 0.0
COOL-CONTROL = WARMEST OA-CONTROL = FIXED
SUPPLY-CFM = 10000. RATED-CFM = 10000.
MIN-AIR-SCH = S_OA% MAX-OA-FRACTION = 0.2
FAN-CONTROL = CONSTANT-VOLUME SUPPLY-DELTA-T = 3.4
SUPPLY-KW = 0.00109
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
MAX-FAN-RATIO = 1.0 NIGHT-CYCLE-CTRL = STAY-OFF
NIGHT-VENT-DT = 0.0 MIN-CFM-RATIO = 1.0
REHEAT-DELTA-T = 65. COOLING-CAPACITY = 309000.
COOL-SH-CAP = 232000. COOL-CTRL-RANGE = 2.
HEATING-CAPACITY = -525000.
SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DIRECT
ZONE-NAMES = (CR_NEW_SPC, S_NEW_SPAC, E_NEW_SPAC) ..

```

```

UNIT-HEATR =SYSTEM  SYSTEM-TYPE = UHT
MAX-SUPPLY-T = 120.0 HEATING-SCHEDULE = S_HE-SCHED
RATED-CFM = 4050. FAN-SCHEDULE = S_HE-SCHED
SUPPLY-DELTA-T = 0.2 SUPPLY-KW = 0.00006
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY
HEATING-CAPACITY = -137000.
ZONE-NAMES = (N_OLD_SPAC, N_NEW_SPAC) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

BLOCK_#1  =REPORT-BLOCK VARIABLE-TYPE = N_OLD_SPAC
           VARIABLE-LIST = (17,18,7,6) ..
BLOCK_#2  =REPORT-BLOCK VARIABLE-TYPE = S_OLD_SPAC
           VARIABLE-LIST = (17,18,7,6) ..
AHU_DD    =REPORT-BLOCK VARIABLE-TYPE = OLD_SYSTEM
           VARIABLE-LIST = (1,2,3,4,5,6,17) ..
AHU_VAV   =REPORT-BLOCK VARIABLE-TYPE = NEW_SYSTEM
           VARIABLE-LIST = (1,2,3,4,5,6,17) ..
BLOCK_#5  =REPORT-BLOCK VARIABLE-TYPE = N_NEW_SPAC
           VARIABLE-LIST = (17,18,7,6) ..
BLOCK_#6  =REPORT-BLOCK VARIABLE-TYPE = S_NEW_SPAC
           VARIABLE-LIST = (17,18,7,6) ..
OLD_ZONES = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
           REPORT-BLOCK = (BLOCK_#1,BLOCK_#2)
..
NEW_ZONES = HOURLY-REPORT REPORT-SCHEDULE = S_HRLY-RPT
           REPORT-BLOCK = (BLOCK_#5,BLOCK_#6)
..

```

DD\_RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
REPORT-BLOCK = (AHU\_DD)

VAV\_RPT = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
REPORT-BLOCK = (AHU\_VAV)

END ..  
COMPUTE SYSTEMS ..

INPUT PLANT ..

\$-----\$  
\$ E Z - D O E P L A N T S I N P U T \$  
\$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*  
  
LINE-4 \*RUN #5 DAY INFILTRATION FOR BLDG. 7485 \*  
LINE-5 \*BOWLING ALLEY \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
PLANT-REPORT VERIFICATION=(PV-A)  
SUMMARY=(PS-B,BEPS)  
HOURLY-DATA-SAVE = YES ..

# \$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..

PD\_OFF =DAY-SCHEDULE (1,24) (0.) ..

PW\_ON =WEEK-SCHEDULE (ALL) PD\_ON ..

PW\_OFF =WEEK-SCHEDULE (ALL) PD\_OFF ..

# \$ HEATING SEASON

P\_HEAT =SCHEDULE THRU MAY 15 PW\_ON  
THRU OCT 1 PW\_OFF  
THRU DEC 31 PW\_ON ..

# \$ COOLING SEASON

P\_COOL =SCHEDULE THRU MAY 15 PW\_OFF  
THRU OCT 1 PW\_ON  
THRU DEC 31 PW\_OFF ..

# \$ EQUIPMENT DESCRIPTION

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 10:33: 1 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR OLD\_SYSTEM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                                    |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -44.644                     | 15                      | 7                    | -8.F                 | -397.178                                | 25782.                             | 45.178                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -28.158                     | 3                       | 7                    | -6.F                 | -370.632                                | 23218.                             | 45.178                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -15.745                     | 3                       | 7                    | 14.F                 | -254.469                                | 25857.                             | 45.178                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -2.564                      | 5                       | 7                    | 30.F                 | -66.765                                 | 25125.                             | 45.178                          |
| MAY   | 61.04487                    | 16                      | 2                    | 62.F                 | 59.F                                    | -1.072                      | 1                       | 2                    | 44.F                 | -40.685                                 | 25601.                             | 45.178                          |
| JUN   | 120.07435                   | 24                      | 20                   | 83.F                 | 74.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 25020.                             | 45.178                          |
| JUL   | 143.32259                   | 23                      | 20                   | 91.F                 | 77.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 25707.                             | 45.178                          |
| AUG   | 141.40668                   | 12                      | 20                   | 92.F                 | 72.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 25857.                             | 45.178                          |
| SEP   | 101.57951                   | 3                       | 20                   | 79.F                 | 71.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 24945.                             | 45.178                          |
| OCT   | 2.98430                     | 1                       | 20                   | 70.F                 | 64.F                                    | -2.111                      | 19                      | 1                    | 29.F                 | -45.173                                 | 25654.                             | 45.178                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -8.982                      | 3                       | 6                    | 13.F                 | -185.575                                | 24711.                             | 45.178                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -34.314                     | 13                      | 7                    | 2.F                  | -348.819                                | 25835.                             | 45.178                          |
| TOTAL | 570.413                     |                         |                      |                      |   | -137.590                    |                         |                      |                      |   | 303316.                            |                                 |
| MAX   |                             |                         |                      |                      | 517.730                                 |                             |                         |                      |                      | -397.178                                |                                    | 45.178                          |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 10:33: 1 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR OLD\_SYSTEM TOPEKA, KS

| MONTH  | HOURS           |                 |                   |          | HOURS             |                   |         |         | HOURS |          |      |         | COINCIDENT LOADS                                   |  |  |  |
|--------|-----------------|-----------------|-------------------|----------|-------------------|-------------------|---------|---------|-------|----------|------|---------|--|--|--|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | VENTING | NIGHT | FLOATING | WHEN | FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |  |
| JAN    | 0               | 744             | 0                 | 0        | 744               | 0                 | 744     | 0       | 0     | 0        | 0    | 0       | -2.748   | 42.228   |  |  |
| FEB    | 0               | 672             | 0                 | 0        | 672               | 0                 | 672     | 0       | 0     | 0        | 0    | 0       | -0.785   | 42.228   |  |  |
| MAR    | 0               | 744             | 0                 | 0        | 744               | 0                 | 744     | 0       | 0     | 0        | 0    | 0       | -0.609   | 42.228   |  |  |
| APR    | 0               | 720             | 0                 | 0        | 720               | 0                 | 720     | 0       | 0     | 0        | 0    | 0       | -1.412   | 42.883   |  |  |
| MAY    | 372             | 360             | 0                 | 12       | 360               | 384               | 744     | 0       | 0     | 0        | 12   | 9       | 0.000  | 17.440   |  |  |
| JUN    | 711             | 0               | 0                 | 9        | 0                 | 720               | 744     | 0       | 0     | 0        | 0    | 0       | 0.000  | 45.178   |  |  |
| JUL    | 744             | 0               | 0                 | 0        | 0                 | 744               | 744     | 0       | 0     | 0        | 0    | 0       | 0.000  | 45.178   |  |  |
| AUG    | 742             | 0               | 0                 | 2        | 0                 | 744               | 744     | 0       | 0     | 0        | 0    | 2       | 0.000  | 45.178   |  |  |
| SEP    | 644             | 0               | 0                 | 76       | 0                 | 720               | 720     | 0       | 0     | 0        | 76   | 5       | 0.000  | 45.178   |  |  |
| OCT    | 19              | 720             | 0                 | 5        | 0                 | 24                | 744     | 0       | 0     | 0        | 0    | 0       | 0.000  | 45.178   |  |  |
| NOV    | 0               | 720             | 0                 | 0        | 720               | 0                 | 720     | 0       | 0     | 0        | 0    | 0       | -5.430   | 42.228   |  |  |
| DEC    | 0               | 744             | 0                 | 0        | 744               | 0                 | 744     | 0       | 0     | 0        | 0    | 0       | -10.937  | 43.539   |  |  |
| ANNUAL | 3232            | 5424            | 0                 | 104      | 5424              | 3336              | 8760    | 0       | 0     | 0        | 104  |         |  |  |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 10:33: 1 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR NEW\_SYSTEM TOPEKA, KS

| MONTH | COOLING           |                         |                      | HEATING                     |                         |                      | ELECTRIC                           |   |                                 |
|-------|-------------------|-------------------------|----------------------|-----------------------------|-------------------------|----------------------|------------------------------------|---|---------------------------------|
|       | COOLING<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000           |                         |                      | -45.354                     | 15                      | 7                    | 17379.                             | -324.596                                | 29.532                          |
| FEB   | 0.00000           |                         |                      | -31.798                     | 3                       | 7                    | 15644.                             | -296.073                                | 29.532                          |
| MAR   | 0.00000           |                         |                      | -20.370                     | 3                       | 7                    | 17454.                             | -218.460                                | 29.532                          |
| APR   | 0.00000           |                         |                      | -2.954                      | 5                       | 7                    | 16941.                             | -103.806                                | 29.532                          |
| MAY   | 43.19068          | 16                      | 2                    | -0.596                      | 1                       | 2                    | 17249.                             | -20.937                                 | 29.532                          |
| JUN   | 90.50021          | 24                      | 20                   | 0.000                       |                         |                      | 16885.                             | 0.000                                   | 29.532                          |
| JUL   | 109.73031         | 23                      | 20                   | 0.000                       |                         |                      | 17305.                             | 0.000                                   | 29.532                          |
| AUG   | 110.16496         | 20                      | 20                   | 0.000                       |                         |                      | 17454.                             | 0.000                                   | 29.532                          |
| SEP   | 79.23198          | 3                       | 20                   | 0.000                       |                         |                      | 16810.                             | 0.000                                   | 29.532                          |
| OCT   | 2.39482           | 1                       | 20                   | -1.585                      | 2                       | 6                    | 17277.                             | -39.134                                 | 29.532                          |
| NOV   | 0.00000           |                         |                      | -11.283                     | 3                       | 6                    | 16652.                             | -183.299                                | 29.532                          |
| DEC   | 0.00000           |                         |                      | -35.769                     | 13                      | 7                    | 17407.                             | -276.104                                | 29.532                          |
| TOTAL | 435.213           |                         |                      | -149.709                    |                         |                      | 204455.                            | -324.596                                | 29.532                          |
| MAX   |                   |                         |                      |                             |                         |                      |                                    |   |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 10:33: 1 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR NEW\_SYSTEM TOPEKA, KS

| MONTH  | COOLING                  |                          |  | HEATING                    |                            |                           | ELECTRIC                  |                                      |  |
|--------|--------------------------|--------------------------|--|----------------------------|----------------------------|---------------------------|---------------------------|--------------------------------------|--|
|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) |
| JAN    | 0                        | 734                      | 0  | 744                        | 0                          | 0                         | 0                         | 10                                   | -6.431   |
| FEB    | 0                        | 653                      | 0  | 672                        | 0                          | 0                         | 0                         | 19                                   | -6.965   |
| MAR    | 0                        | 575                      | 0  | 744                        | 0                          | 0                         | 0                         | 169                                  | -8.236   |
| APR    | 0                        | 320                      | 0  | 720                        | 0                          | 0                         | 0                         | 400                                  | -1.561   |
| MAY    | 362                      | 145                      | 0  | 360                        | 384                        | 0                         | 0                         | 237                                  | 0.000  |
| JUN    | 705                      | 0                        | 0  | 0                          | 720                        | 0                         | 0                         | 15                                   | 0.000  |
| JUL    | 744                      | 0                        | 0  | 0                          | 744                        | 0                         | 0                         | 0                                    | 0.000  |
| AUG    | 742                      | 0                        | 0  | 0                          | 744                        | 0                         | 0                         | 2                                    | 0.000  |
| SEP    | 655                      | 0                        | 0  | 0                          | 720                        | 0                         | 0                         | 65                                   | 0.000  |
| OCT    | 19                       | 296                      | 0  | 720                        | 24                         | 0                         | 0                         | 429                                  | 0.000  |
| NOV    | 0                        | 481                      | 0  | 720                        | 0                          | 0                         | 0                         | 239                                  | -14.861  |
| DEC    | 0                        | 700                      | 0  | 744                        | 0                          | 0                         | 0                         | 44                                   | -21.003  |
| ANNUAL | 3227                     | 3904                     | 0  | 5424                       | 3336                       | 0                         | 0                         | 1629                                 |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 10:33: 1 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR UNIT-HEATR TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -19.801                     | 15                      | 7                    | -8. F                | -68.725                                 | 2.823                           |
| FEB   | 0.00000                     |                         |                      |                      | -13.271                     | 3                       | 7                    | -5. F                | -58.491                                 | 2.807                           |
| MAR   | 0.00000                     |                         |                      |                      | -7.753                      | 4                       | 7                    | 14. F                | -38.918                                 | 2.773                           |
| APR   | 0.00000                     |                         |                      |                      | -0.717                      | 1                       | 6                    | 54. F                | -18.313                                 | 2.741                           |
| MAY   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 2.717                           |
| JUN   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 2.717                           |
| JUL   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 2.717                           |
| AUG   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 2.717                           |
| SEP   | 0.00000                     |                         |                      |                      | 0.000                       |                         |                      |                      | 0.000                                   | 2.717                           |
| OCT   | 0.00000                     |                         |                      |                      | -0.404                      | 20                      | 8                    | 23. F                | -17.871                                 | 2.745                           |
| NOV   | 0.00000                     |                         |                      |                      | -6.088                      | 3                       | 7                    | 19. F                | -34.461                                 | 2.769                           |
| DEC   | 0.00000                     |                         |                      |                      | -16.079                     | 15                      | 7                    | 11. F                | -59.484                                 | 2.804                           |
| TOTAL | 0.000                       |                         |                      |                      | -64.113                     |                         |                      |                      | -68.725                                 | 2.823                           |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 10:33: 1 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR UNIT-HEATR TOPEKA, KS

| MONTH  | HOURS           |                 |                    |          | HOURS             |                   |         |                   | HOURS   |                   |         |                   | COINCIDENT LOADS                                   |  |
|--------|-----------------|-----------------|--------------------|----------|-------------------|-------------------|---------|-------------------|---------|-------------------|---------|-------------------|--|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COINCIDENT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | HEATING<br>AVAIL. | FANS ON | COOLING<br>AVAIL. | FANS ON | HEATING<br>AVAIL. | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0               | 740             | 0                  | 4        | 744               | 0                 | 744     | 0                 | 744     | 0                 | 0       | 0                 | -15.695  | 2.743  |
| FEB    | 0               | 663             | 0                  | 9        | 672               | 0                 | 672     | 0                 | 672     | 0                 | 0       | 0                 | -13.177  | 2.738  |
| MAR    | 0               | 546             | 0                  | 198      | 744               | 0                 | 744     | 0                 | 744     | 0                 | 0       | 0                 | -12.723  | 2.738  |
| APR    | 0               | 95              | 0                  | 625      | 720               | 0                 | 720     | 0                 | 720     | 0                 | 0       | 0                 | 0.000  | 2.717  |
| MAY    | 0               | 0               | 0                  | 744      | 360               | 0                 | 744     | 0                 | 744     | 0                 | 0       | 0                 | 0.000  | 0.000  |
| JUN    | 0               | 0               | 0                  | 720      | 0                 | 0                 | 720     | 0                 | 720     | 0                 | 0       | 0                 | 0.000  | 0.000  |
| JUL    | 0               | 0               | 0                  | 744      | 0                 | 0                 | 744     | 0                 | 744     | 0                 | 0       | 0                 | 0.000  | 0.000  |
| AUG    | 0               | 0               | 0                  | 744      | 0                 | 0                 | 744     | 0                 | 744     | 0                 | 0       | 0                 | 0.000  | 0.000  |
| SEP    | 0               | 0               | 0                  | 720      | 0                 | 0                 | 720     | 0                 | 720     | 0                 | 0       | 0                 | 0.000  | 0.000  |
| OCT    | 0               | 41              | 0                  | 703      | 720               | 0                 | 744     | 0                 | 720     | 0                 | 0       | 0                 | -0.339   | 2.717  |
| NOV    | 0               | 430             | 0                  | 290      | 720               | 0                 | 720     | 0                 | 720     | 0                 | 0       | 0                 | -20.816  | 2.751  |
| DEC    | 0               | 737             | 0                  | 7        | 744               | 0                 | 744     | 0                 | 744     | 0                 | 0       | 0                 | -20.660  | 2.751  |
| ANNUAL | 0               | 3252            | 0                  | 5508     | 5424              | 0                 | 8760    | 0                 | 3336    | 0                 | 0       | 0                 |  |  |

EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 10:33: 1 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #5 DAY INFILTRATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | NATURAL-GAS<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR |
|-----|--|---|---|
| JAN | 160.733<br>279.628<br>14/22                      | 169.971<br>995.532<br>15/ 7                         |   |
| FEB | 143.578<br>275.443<br>3/ 9                       | 117.641<br>926.592<br>3/ 7                          |   |
| MAR | 157.708<br>269.597<br>3/ 9                       | 74.958<br>685.938<br>3/ 7                           |   |
| APR | 150.669<br>267.094<br>1/20                       | 17.163<br>315.155<br>5/ 7                           |   |
| MAY | 184.615<br>452.387<br>16/18                      | 6.212<br>110.384<br>1/ 2                            |   |
| JUN | 215.288<br>448.644<br>24/20                      | 0.000<br>0.000<br>30/ 1                             |   |
| JUL | 232.839<br>473.041<br>23/20                      | 0.000<br>0.000<br>31/ 1                             |   |
| AUG | 235.991<br>471.441<br>12/20                      | 0.000<br>0.000<br>31/ 1                             |   |
| SEP | 204.432<br>443.494<br>3/20                       | 0.000<br>0.000<br>30/ 1                             |   |
| OCT | 155.155<br>398.731<br>1/18                       | 13.673<br>131.480<br>19/ 1                          |   |
| NOV | 149.714<br>268.129<br>12/20                      | 48.948<br>570.489<br>3/ 6                           |   |
| DEC | 159.970<br>275.433<br>15/ 9                      | 137.232<br>879.601<br>13/ 7                         |   |
|     | ONE YEAR<br>USE/PEAK                             | 2150.691<br>473.041                                 | 585.798<br>995.532                                  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/18/1995 10:33: 1 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG. 7485 BOWLING ALLEY  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 26.14       | 585.80      |
| SPACE COOL      | 324.29      | 0.00        |
| HVAC AUX        | 860.01      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 805.78      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 134.53      | 0.00        |
| TOTAL           | 2150.74     | 585.80      |

TOTAL SITE ENERGY 2736.49 MBTU 77.7 KBTU/SQFT-YR GROSS-AREA 78.4 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 7044.33 MBTU 200.0 KBTU/SQFT-YR GROSS-AREA 201.8 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 41.8  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



**COMPUTER ENERGY SIMULATIONS**

**BLDG. 7866  
THEATER BUILDINGS**



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS  
BUILDING NO.: 7866  
BLDG. TYPE: THEATER

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

## ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3    | RUN4    | RUN5    |
|----------------|---------|---------|---------|---------|---------|---------|
| HEATING (MBtu) | 1073.8  | 401.0   | 686.8   | 414.7   | 514.8   | 951.2   |
| COOLING (kWH)  | 213,352 | 154,500 | 196,050 | 149,856 | 200,952 | 202,789 |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 16,952 CFM                        |
| FLOOR AREA     | 8,449 FT <sup>2</sup>             |
| CFMI           | 2882 CFM                          |
| UA             | 3333 BTU/HR-°F                    |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

### EZDOE COMPUTER RUN DEFINITION:

|         |                             |
|---------|-----------------------------|
| BASERUN | EXISTING OPERATION          |
| RUN1    | NIGHT SETBACK               |
| RUN2    | DDC CONTROL                 |
| RUN3    | ECONOMIZER                  |
| RUN4    | NIGHTTIME INFILTRATION (OA) |
| RUN5    | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      |            | ANNUAL HEATING & COOLING HOURS |            |
|--------------------|-------------------|------|------------|--------------------------------|------------|
| TH-F               | 1700              | 2400 | 14 HR      | HR. ON HEATING                 | 908 HR/YR  |
| SAT.               | 1700              | 2400 | 7 HR       | HR. ON COOLING                 | 552 HR/YR  |
| SUN.               | 1700              | 2400 | 7 HR       | HR. OFF HEATING                | 4540 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 28 HR/WK   | HR. OFF COOLING                | 2760 HR/YR |
|                    | TOTAL UNOCC. HR.  |      | 140 HR/WK  |                                |            |
|                    | ANNUAL OCCUPY HR. |      | 1460 HR/YR |                                |            |
|                    | ANNUAL UNOCC. HR. |      | 7300 HR/YR |                                |            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING

8760 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY

5448 HR/YR

PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY

3312 HR/YR

HRS SAVED (HTG ONLY)

5448

908

=

4540 HR/YR

HRS SAVED (CLG ONLY)

3312

552

=

2760 HR/YR

|           |   |   |               |           |                     |
|-----------|---|---|---------------|-----------|---------------------|
| HOAUHC    | 1073.81 MBtu  | - | 514.8 MBtu    | =         | 2.66E+01 Btu/CFM-HR |
|           | 2881.84 CFM   | x | 7300 HR/YR    |           |                     |
| HOAUH     | 1073.81 MBtu  | - | 514.8 MBtu    | =         | 4.27E+01 Btu/CFM-HR |
|           | 2881.84 CFM   | x | 4540 HR/YR    |           |                     |
| COAUHC    | 213,351.9 kWH   | - | 200,952.2 kWH | =         | 5.89E-04 kWH/CFM-HR |
|           | 2881.84 CFM   | x | 7300 HR/YR    |           |                     |
| COAUC     | 213,351.9 kWH   | - | 200,952.2 kWH | =         | 1.56E-03 kWH/CFM-HR |
|           | 2881.84 CFM   | x | 2760 HR/YR    |           |                     |
| HOAOHC    | 1073.81 MBtu  | - | 951.16 MBtu   | =         | 2.92E+01 Btu/CFM-HR |
|           | 2881.84 CFM   | x | 1460 HR/YR    |           |                     |
| HOAOH     | 1073.81 MBtu  | - | 951.16 MBtu   | =         | 4.69E+01 Btu/CFM-HR |
|           | 2881.84 CFM   | x | 908 HR/YR     |           |                     |
| COAOHC    | 213,351.9 kWH   | - | 202,789.3 kWH | =         | 2.51E-03 kWH/CFM-HR |
|           | 2881.84 CFM   | x | 1460 HR/YR    |           |                     |
| COAOC     | 213,351.9 kWH   | - | 202,789.3 kWH | =         | 6.64E-03 kWH/CFM-HR |
|           | 2881.84 CFM   | x | 552 HR/YR     |           |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | =         | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | =         | 0.17                |
| ECC       | 154,500.4 kWH   | - | 149,856.4 kWH | =         | 4.96E-04 kWH/CFM-HR |
|           | 16952 CFM   | x | 552 HR/YR     |           |                     |
| ECHC      | 154,500.4 kWH   | - | 149,856.4 kWH | =         | 1.88E-04 kWH/CFM-HR |
|           | 16952 CFM   | x | 1460 HR/YR    |           |                     |
| NSUCHC    | 213,351.9 kWH   | - | 154,500.4 kWH | =         | 4.76E-04 kWH/CFM-HR |
|           | 16952 CFM   | x | 7300 HR/YR    |           |                     |
| NSUCC     | 213,351.9 kWH   | - | 154,500.4 kWH | =         | 1.26E-03 kWH/CFM-HR |
|           | 16952 CFM   | x | 2760 HR/YR    |           |                     |
| DDCCHC    | 213,351.9 kWH   | - | 196,050.4 kWH | =         | 6.99E-04 kWH/CFM-HR |
|           | 16952 CFM   | x | 1460 HR/YR    |           |                     |
| DDCCC     | 213,351.9 kWH   | - | 196,050.4 kWH | =         | 1.85E-03 kWH/CFM-HR |
|           | 16952 CFM   | x | 552 HR/YR     |           |                     |
| NSC       | 1073.81 MBtu  | - | 400.95 MBtu   | =         | 2.02E+05 Btu/UA     |
|           | 3333.12 UA  |   |               |           |                     |
| DDCH      | 1073.81 MBtu  | - | 686.84 MBtu   | =         | 1.16E+05 Btu/UA     |
|           | 3333.12 UA  |   |               |           |                     |
| OPT       | (2 HR/DAY X 240 DAY/YR)                               |   |               | 175 HR/YR |                     |
|           |   |   |               | =         | 305 HR/YR           |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               |           |                     |
|           |   |   |               | =         | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01          | =         | 5.67 HR/YR          |



INPUT LOADS ..

```

$-----$
$ E Z - D O E   L O A D S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BLDG. #7866      *
        LINE-5 *THEATER W/DRESS RM                        * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
LOADS-REPORT VERIFICATION=(LV-D)
              SUMMARY=(LS-C,LS-D)
              HOURLY-DATA-SAVE = YES ..
BUILDING-LOCATION LATITUDE = 39.0
                  LONGITUDE = 96.5
                  ALTITUDE = 1065.
                  TIME-ZONE = 6
                  GROSS-AREA = 8450
                  SHIELDING-COEF = 0.29
                  X-REF = 0.0
                  Y-REF = 0.0 ..
RUN-PERIOD   JAN 1 1994 THRU DEC 31 1994 ..

```

## \$ SCHEDULES

```

LD_LITES    =DAY-SCHEDULE (1,16) (0.)
              (17,21) (1.,0.1,0.5,0.1,0.5)
              (22,24) (0.1,0.5,1.) ..

LD_LOB-PEO  =DAY-SCHEDULE (1,16) (0.)
              (17,21) (0.75,0.15,0.75,0.15,0.75)
              (22,23) (0.15,0.75)
              (24) (0.) ..

LD_ON       =DAY-SCHEDULE (1,24) (1.) ..

LD_OFF      =DAY-SCHEDULE (1,24) (0.) ..

LD_R-SN_PE  =DAY-SCHEDULE (1,16) (0.)
              (17) (0.1)
              (18,21) (0.95)
              (22,24) (0.8) ..

LD_LOB_LIT  =DAY-SCHEDULE (1,16) (0.)
              (17,24) (1.) ..

```

LW\_ON =WEEK-SCHEDULE (ALL) LD\_ON ..

LW\_OFF =WEEK-SCHEDULE (ALL) LD\_OFF ..

LW\_PEOP-TE =WEEK-SCHEDULE (MON) LD\_OFF  
 (TUE) LD\_OFF  
 (WED) LD\_OFF  
 (THU) LD\_R-SN\_PE  
 (FRI) LD\_R-SN\_PE  
 (SAT) LD\_R-SN\_PE  
 (SUN) LD\_R-SN\_PE  
 (HOL) LD\_R-SN\_PE ..

LW\_LITE-TE =WEEK-SCHEDULE (MON) LD\_OFF  
 (TUE) LD\_OFF  
 (WED) LD\_OFF  
 (THU) LD\_LITES  
 (FRI) LD\_LITES  
 (SAT) LD\_LITES  
 (SUN) LD\_LITES  
 (HOL) LD\_LITES ..

LW\_LOB-PEO =WEEK-SCHEDULE (MON) LD\_OFF  
 (TUE) LD\_OFF  
 (WED) LD\_OFF  
 (THU) LD\_LOB-PEO  
 (FRI) LD\_LOB-PEO  
 (SAT) LD\_LOB-PEO  
 (SUN) LD\_LOB-PEO  
 (HOL) LD\_LOB-PEO ..

LW\_LOB-LIT =WEEK-SCHEDULE (MON) LD\_OFF  
 (TUE) LD\_OFF  
 (WED) LD\_OFF  
 (THU) LD\_LOB\_LIT  
 (FRI) LD\_LOB\_LIT  
 (SAT) LD\_LOB\_LIT  
 (SUN) LD\_LOB\_LIT  
 (HOL) LD\_LOB\_LIT ..

\$ ON 100% OF THE TIME

L\_ON =SCHEDULE THRU DEC 31 LW\_ON ..

\$ OFF 100% OF THE TIME

L\_OFF =SCHEDULE THRU DEC 31 LW\_OFF ..

\$ PEOPLE LOAD IN THEATER

L\_PEOP-THE =SCHEDULE THRU DEC 31 LW\_PEOP-TE ..

\$ LIGHTING LOAD IN THEATER

L\_LIT-THE =SCHEDULE THRU DEC 31 LW\_LITE-TE ..

\$ PEOPLE LOAD IN LOBBY

L\_PEOP-LOB =SCHEDULE THRU DEC 31 LW\_LOB-PEO ..

\$ LIGHT/EQUIP LOAD LOBBY

L\_LIT-LOEB =SCHEDULE THRU DEC 31 LW\_LOB-LIT ..

# \$ CONSTRUCTION TYPES

## \$ HIGH WALL BRICK, 12IN CMU

WALL-1 =LAYERS MATERIAL=(BK01,AL11,CB36) I-F-R= 0.6100  
THICKNESS=(0.333,0.000,1.000) ..

EXWALL-1 =CONSTRUCTION LAYERS = WALL-1  
ABSORPTANCE = 0.880  
ROUGHNESS = 2 ..

FLOOR =CONSTRUCTION U-VALUE = 0.020  
ABSORPTANCE = 0.610  
ROUGHNESS = 5 ..

## \$ BUILT-UP ROOF W/INSL& NO CEILING

BLT-ROOF =LAYERS MATERIAL=(HF-E2,HF-A3,IN74,HF-A3,AL33,GP04)  
THICKNESS=(0.042,0.005,0.167,0.005,0.000,0.063) ..

ROOF-1 =CONSTRUCTION LAYERS = BLT-ROOF  
ABSORPTANCE = 0.800  
ROUGHNESS = 1 ..

## \$ STANDARD METAL DOOR

DOOR-STD =LAYERS MATERIAL=(HF-A3,IN34,HF-A3) I-F-R= 0.6100  
THICKNESS=(0.005,0.104,0.005) ..

DOOR-MET =CONSTRUCTION LAYERS = DOOR-STD  
ABSORPTANCE = 0.860  
ROUGHNESS = 5 ..

## \$ SHORT EXTERIOR WALL CMU

SHRT-WAL =LAYERS MATERIAL=(CB26,AL11,CB21) I-F-R= 0.6100  
THICKNESS=(0.500,0.000,0.333) ..

EXWALL-2 =CONSTRUCTION LAYERS = SHRT-WAL  
ABSORPTANCE = 0.880  
ROUGHNESS = 2 ..

2\_PN\_STD =GLASS-TYPE GLASS-TYPE-CODE = 2  
PANES = 2 ..

# \$ SPACE DESCRIPTION

THEATER =SPACE AREA = 5589.0 VOLUME = 139725.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOPE-THE  
NUMBER-OF-PEOPLE = 288.0 PEOPLE-HG-LAT = 105.0  
PEOPLE-HG-SENS = 245.0 LIGHTING-TYPE = INCAND  
LIGHTING-KW = 11.98 LIGHT-TO-SPACE = 1.0

LIGHTING-SCHEDULE = L\_LIT-THE SOURCE-SENSIBLE = 0.0  
 FURN-WEIGHT = 0.5 INF-METHOD = NONE ..

E-W HEIGHT = 24.0 WIDTH = 94.0 CONS = EXWALL-1  
 AZIMUTH = 291 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 2.5 CONS = DOOR-MET  
 MULTIPLIER = 3.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 24.0 WIDTH = 94.0 CONS = EXWALL-1  
 AZIMUTH = 111 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 2.5 CONS = DOOR-MET  
 MULTIPLIER = 3.0 SETBACK = 0.2  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 24.0 WIDTH = 61.0 CONS = EXWALL-1  
 AZIMUTH = 201 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 2.5 CONS = DOOR-MET  
 SETBACK = 0.2 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 61.0 WIDTH = 94.0 CONS = ROOF-1  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

U-W HEIGHT = 61.0 WIDTH = 94.0 CONS = FLOOR ..

LOBBY =SPACE AREA = 2268.0 VOLUME = 38556.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOP-LOB NUMBER-OF-PEOPLE = 96.0  
 PEOPLE-HG-LAT = 250.0 PEOPLE-HG-SENS = 250.0  
 LIGHTING-TYPE = INCAND LIGHTING-KW = 3.92  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LIT-LOBB  
 EQUIP-SCHEDULE = L\_LIT-LOBB EQUIPMENT-KW = 2.29  
 SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.5  
 INF-METHOD = NONE ..

E-W HEIGHT = 17.0 WIDTH = 36.0 CONS = EXWALL-2  
 AZIMUTH = 291 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 2.5 CONS = DOOR-MET  
 SETBACK = 0.2 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 17.0 WIDTH = 61.0 CONS = EXWALL-2  
 AZIMUTH = 21 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.0 WIDTH = 2.5 G-T = 2\_PN\_STD

MULTIPLIER = 6.0 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 11.0 WIDTH = 9.0 G-T = 2\_PN\_STD  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 17.0 WIDTH = 36.0 CONS = EXWALL-2  
AZIMUTH = 111 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 2.5 CONS = DOOR-MET  
SETBACK = 0.2 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 36.0 WIDTH = 61.0 CONS = ROOF-1  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

U-W HEIGHT = 36.0 WIDTH = 61.0 CONS = FLOOR ..

PROJ-ROOM =SPACE AREA = 592.0 VOLUME = 6512.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_LIT-LOBB NUMBER-OF-PEOPLE = 1.0  
PEOPLE-HG-LAT = 250.0 PEOPLE-HG-SENS = 250.0  
LIGHTING-TYPE = INCAND LIGHTING-W/SQFT = 1.75  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LIT-LOBB  
EQUIP-SCHEDULE = L\_LIT-LOBB EQUIPMENT-KW = 4.84  
SOURCE-SENSIBLE = 0.0 FURN-WEIGHT = 0.5  
INF-METHOD = NONE ..

E-W HEIGHT = 11.0 WIDTH = 16.0 CONS = EXWALL-2  
AZIMUTH = 291 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 11.0 WIDTH = 16.0 CONS = EXWALL-2  
AZIMUTH = 111 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 2.5 CONS = DOOR-MET  
SETBACK = 0.2 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 11.0 WIDTH = 37.0 CONS = EXWALL-2  
AZIMUTH = 21 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 16.0 WIDTH = 37.0 CONS = ROOF-1  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

U-W HEIGHT = 16.0 WIDTH = 37.0 CONS = FLOOR ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..



```

$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *BASELINE SIMULATION FOR BLDG. #7866      *
        LINE-5 *THEATER W/DRESS RM                        * ..

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                  SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                  HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
SD_WT_HT   =DAY-SCHEDULE (1,24) (74.) ..
SD_SM_CL   =DAY-SCHEDULE (1,24) (72.) ..
SD_WT_CL   =DAY-SCHEDULE (1,24) (74.2) ..
SD_SM_HT   =DAY-SCHEDULE (1,24) (71.8) ..
SD_OA%     =DAY-SCHEDULE (1,24) (0.17) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..

SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT   =WEEK-SCHEDULE (ALL) SD_WT_HT ..

SW_SM_CL   =WEEK-SCHEDULE (ALL) SD_SM_CL ..

SW_WT_CL   =WEEK-SCHEDULE (ALL) SD_WT_CL ..

SW_SM_HT   =WEEK-SCHEDULE (ALL) SD_SM_HT ..

SW_OA%     =WEEK-SCHEDULE (ALL) SD_OA% ..

```

## \$ FULL ON SYSTEM

```

S_ON      =SCHEDULE THRU DEC 31 SW_ON ..

```

## \$ FULL OFF SYSTEM

```

S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..

```

## \$ HEATING SEASON

```

S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT 1 SW_OFF
              THRU DEC 31 SW_ON ..

```

## \$ COOLING SEASON

S\_CL\_SCHD =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

S\_HRLY\_RPT =SCHEDULE THRU JAN 9 SW\_OFF  
 THRU JAN 10 SW\_ON  
 THRU JAN 22 SW\_OFF  
 THRU JAN 23 SW\_ON  
 THRU JUL 18 SW\_OFF  
 THRU JUL 19 SW\_ON  
 THRU JUL 22 SW\_OFF  
 THRU JUL 23 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

## \$ ZONE DESCRIPTION

THEATER =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

LOBBY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

PROJ-ROOM =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

AHU-1 =SYSTEM SYSTEM-TYPE = SZRH  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHD HEAT-SET-T = 55.0

```

PREHEAT-T = 0.0  OA-CONTROL = FIXED
SUPPLY-CFM = 14500.  RATED-CFM = 14500.
MIN-AIR-SCH = S_OA%  MAX-OA-FRACTION = 0.17
SUPPLY-DELTA-T = 2.4  SUPPLY-KW = 0.00078
FAN-PLACEMENT = BLOW-THROUGH
NIGHT-CYCLE-CTRL = STAY-OFF  NIGHT-VENT-DT = 0.0
MIN-CFM-RATIO = 1.0  REHEAT-DELTA-T = 27.8
COOLING-CAPACITY = 453656.  COOL-SH-CAP = 380832.
HEATING-CAPACITY = -417300.
SIZING-OPTION = COINCIDENT  RETURN-AIR-PATH = DUCT
ZONE-NAMES = (THEATER, LOBBY) ..

```

```

AHU-2      =SYSTEM  SYSTEM-TYPE = SZRH
MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
HEATING-SCHEDULE = S_ON  COOLING-SCHEDULE = S_ON
HEAT-SET-T = 55.0  PREHEAT-T = 0.0
OA-CONTROL = FIXED  SUPPLY-CFM = 1800.
RATED-CFM = 1800.  MIN-AIR-SCH = S_OA%
MAX-OA-FRACTION = 0.17  SUPPLY-DELTA-T = 2.4
SUPPLY-KW = 0.00078  FAN-PLACEMENT = BLOW-THROUGH
NIGHT-CYCLE-CTRL = STAY-OFF  NIGHT-VENT-DT = 0.0
MIN-CFM-RATIO = 1.0  REHEAT-DELTA-T = 17.
COOLING-CAPACITY = 48900.  COOL-SH-CAP = 48900.
HEATING-CAPACITY = -30709.3
ZONE-HEAT-SOURCE = ELECTRIC
SIZING-OPTION = COINCIDENT  RETURN-AIR-PATH = DUCT
ZONE-NAMES = (PROJ-ROOM) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

THEAT-BLK  =REPORT-BLOCK VARIABLE-TYPE = THEATER
            VARIABLE-LIST = (17,18,7,6) ..
LOBBY-BLK  =REPORT-BLOCK VARIABLE-TYPE = LOBBY
            VARIABLE-LIST = (17,18,7,6) ..
PROJ-BLK   =REPORT-BLOCK VARIABLE-TYPE = PROJ-ROOM
            VARIABLE-LIST = (17,18,7,6) ..
AHU-1-BLK  =REPORT-BLOCK VARIABLE-TYPE = AHU-1
            VARIABLE-LIST = (3,5,6,17,39) ..
AHU-2-BLK  =REPORT-BLOCK VARIABLE-TYPE = AHU-2
            VARIABLE-LIST = (3,5,6,17,39) ..
ZONES-HRLY = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY_RPT
            REPORT-BLOCK = (THEAT-BLK, LOBBY-BLK, PROJ-BLK)
..
AHU-HRLY   = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY_RPT
            REPORT-BLOCK = (AHU-1-BLK, AHU-2-BLK)
..
END ..
COMPUTE SYSTEMS ..

```

INPUT PLANT ..

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*BASELINE SIMULATION FOR BLDG. #7866 \*  
 LINE-5 \*THEATER W/DRESS RM \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 PLANT-REPORT VERIFICATION=(PV-A)  
 SUMMARY=(PS-B,BEPS)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 PD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 PW\_ON =WEEK-SCHEDULE (ALL) PD\_ON ..  
 PW\_OFF =WEEK-SCHEDULE (ALL) PD\_OFF ..

## \$ HEATING SEASON

P\_HEAT =SCHEDULE THRU MAY 15 PW\_ON  
 THRU OCT 1 PW\_OFF  
 THRU DEC 31 PW\_ON ..

## \$ COOLING SEASON

P\_COOL =SCHEDULE THRU MAY 15 PW\_OFF  
 THRU OCT 1 PW\_ON  
 THRU DEC 31 PW\_OFF ..

## \$ EQUIPMENT DESCRIPTION

BOILER-HW =PLANT-EQUIPMENT TYPE = HW-BOILER  
 SIZE = -999. ..

CHILLER-RC =PLANT-EQUIPMENT TYPE = HERM-REC-CHLR  
 SIZE = -999. ..

PLANT-PARAMETERS BOILER-FUEL = NATURAL-GAS HERM-REC-COND-TYPE = AIR  
 CCIRC-HEAD = 25.0 HCIRC-HEAD = 25.0 ..

ENERGY-RESOURCE RESOURCE = ELECTRICITY ..  
 ENERGY-RESOURCE RESOURCE = NATURAL-GAS ..

Path: C:\ELITE\EZDOE

File: MOD7866 .INP 19,038 .a.. 5-19-95 10:13:34

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END ..  
COMPUTE PLANT ..  
STOP ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10:13:39 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

NUMBER OF EXTERIOR SURFACES 12 RECTANGULAR 12 OTHER 0  
 (U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED )

| SURFACE   | SPACE | U-VALUE<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | WALL<br>AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | WALL<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) | AZIMUTH   |
|-----------|-------|----------------------------|-------------------------|----------------------------|------------------------|----------------------------|-------------------------|----------------------------|------------------------|--------------------------------|-----------|
| LOBBY     |       | 0.490                      | 159.00                  | 0.236                      | 878.00                 | 0.275                      | 1037.00                 | 0.236                      | 407.00                 | 1037.00                        | NORTH     |
| PROJ-ROOM |       | 0.000                      | 0.00                    | 0.236                      | 407.00                 | 0.236                      | 407.00                  | 0.236                      | 612.00                 | 407.00                         | NORTH     |
| LOBBY     |       | 0.000                      | 0.00                    | 0.236                      | 612.00                 | 0.236                      | 612.00                  | 0.236                      | 176.00                 | 612.00                         | EAST      |
| PROJ-ROOM |       | 0.000                      | 0.00                    | 0.236                      | 176.00                 | 0.236                      | 176.00                  | 0.236                      | 2256.00                | 176.00                         | EAST      |
| THEATER   |       | 0.000                      | 0.00                    | 0.220                      | 2256.00                | 0.220                      | 2256.00                 | 0.220                      | 1464.00                | 2256.00                        | EAST      |
| THEATER   |       | 0.000                      | 0.00                    | 0.220                      | 1464.00                | 0.220                      | 1464.00                 | 0.220                      | 176.00                 | 1464.00                        | SOUTH     |
| PROJ-ROOM |       | 0.000                      | 0.00                    | 0.236                      | 176.00                 | 0.236                      | 176.00                  | 0.236                      | 2256.00                | 176.00                         | WEST      |
| THEATER   |       | 0.000                      | 0.00                    | 0.220                      | 2256.00                | 0.220                      | 2256.00                 | 0.220                      | 612.00                 | 2256.00                        | WEST      |
| LOBBY     |       | 0.000                      | 0.00                    | 0.236                      | 612.00                 | 0.236                      | 612.00                  | 0.236                      | 2196.00                | 612.00                         | WEST      |
| LOBBY     |       | 0.000                      | 0.00                    | 0.127                      | 2196.00                | 0.127                      | 2196.00                 | 0.127                      | 5734.00                | 2196.00                        | ROOF      |
| THEATER   |       | 0.000                      | 0.00                    | 0.127                      | 5734.00                | 0.127                      | 5734.00                 | 0.127                      | 592.00                 | 5734.00                        | ROOF      |
| PROJ-ROOM |       | 0.000                      | 0.00                    | 0.020                      | 5734.00                | 0.020                      | 5734.00                 | 0.020                      | 2196.00                | 5734.00                        | UNDERGRND |
| THEATER   |       | 0.000                      | 0.00                    | 0.020                      | 2196.00                | 0.020                      | 2196.00                 | 0.020                      | 592.00                 | 2196.00                        | UNDERGRND |
| LOBBY     |       | 0.000                      | 0.00                    | 0.020                      | 592.00                 | 0.020                      | 592.00                  | 0.020                      |                        | 592.00                         | UNDERGRND |
| PROJ-ROOM |       | 0.000                      | 0.00                    | 0.020                      |                        | 0.020                      |                         | 0.020                      |                        |                                | UNDERGRND |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10:13:39 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT TOPEKA, KS

|             | AVERAGE<br>U-VALUE/GLASS<br>(BTU/HR-SQFT-F) | AVERAGE<br>U-VALUE/WALLS<br>(BTU/HR-SQFT-F) | AVERAGE U-VALUE<br>WALLS+GLASS<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | OPAQUE<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) |
|-------------|---|---|---|-------------------------|--------------------------|--------------------------------|
| NORTH       | 0.490                                       | 0.236                                       | 0.264   | 159.00                  | 1285.00                  | 1444.00                        |
| EAST        | 0.000                                       | 0.224                                       | 0.224   | 0.00                    | 3044.00                  | 3044.00                        |
| SOUTH       | 0.000                                       | 0.220                                       | 0.220   | 0.00                    | 1464.00                  | 1464.00                        |
| WEST        | 0.000                                       | 0.224                                       | 0.224   | 0.00                    | 3044.00                  | 3044.00                        |
| ROOF        | 0.000                                       | 0.127                                       | 0.127   | 0.00                    | 8522.00                  | 8522.00                        |
| ALL WALLS   | 0.490                                       | 0.225                                       | 0.230   | 159.00                  | 8837.00                  | 8996.00                        |
| WALLS+ROOFS | 0.490                                       | 0.177                                       | 0.180   | 159.00                  | 17359.00                 | 17518.00                       |
| UNDERGRND   | 0.000                                       | 0.020                                       | 0.020   | 0.00                    | 8522.00                  | 8522.00                        |
| BUILDING    | 0.490                                       | 0.125                                       | 0.128   | 159.00                  | 25881.00                 | 26040.00                       |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10:13:39 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS

\*\*\* BUILDING \*\*\*

FLOOR AREA 8449 SQFT 785 SQMT  
 VOLUME 184793 CUFT 5233 CUMT

HEATING LOAD  
 JAN 15 9AM  
 -5F -21C  
 -6F -21C

COOLING LOAD  
 JUL 23 9PM  
 88F 31C  
 76F 24C

TIME  
 DRY-BULB TEMP  
 WET-BULB TEMP

|                      | SENSIBLE<br>(KBTU/H) | ( KW )     | LATENT<br>(KBTU/H) | ( KW )  | SENSIBLE<br>(KBTU/H) | ( KW )     |
|----------------------|----------------------|------------|--------------------|---------|----------------------|------------|
| WALLS                | 39.051               | 11.437     | 0.000              | 0.000   | -149.588             | -43.810    |
| ROOFS                | 32.522               | 9.525      | 0.000              | 0.000   | -90.887              | -26.618    |
| GLASS CONDUCTION     | 1.057                | 0.309      | 0.000              | 0.000   | -6.114               | -1.791     |
| GLASS SOLAR          | 3.176                | 0.930      | 0.000              | 0.000   | 0.320                | 0.094      |
| DOOR                 | 0.533                | 0.156      | 0.000              | 0.000   | -2.455               | -0.719     |
| INTERNAL SURFACES    | 0.000                | 0.000      | 0.000              | 0.000   | 0.000                | 0.000      |
| UNDERGROUND SURFACES | -1.530               | -0.448     | 0.000              | 0.000   | -4.894               | -1.433     |
| OCCUPANTS TO SPACE   | 67.929               | 19.895     | 46.978             | 13.759  | 4.888                | 1.432      |
| LIGHT TO SPACE       | 26.464               | 7.751      | 0.000              | 0.000   | 4.249                | 1.244      |
| EQUIPMENT TO SPACE   | 20.221               | 5.922      | 0.000              | 0.000   | 1.772                | 0.519      |
| PROCESS TO SPACE     | 0.000                | 0.000      | 0.000              | 0.000   | 0.000                | 0.000      |
| INFILTRATION         | 0.000                | 0.000      | 0.000              | 0.000   | 0.000                | 0.000      |
| TOTAL                | 189.421              | 55.477     | 46.978             | 13.759  | -242.708             | -71.083    |
| TOTAL LOAD           | 236.399              | KBTU/H     | 69.235             | KW      | -242.708             | KBTU/H     |
| TOTAL LOAD / AREA    | 27.98                | BTU/H.SQFT | 88.205             | W /SQMT | 28.726               | BTU/H.SQFT |
|                      |                      |            |                    |         |                      | W /SQMT    |

\*\*\*\*\*  
 \* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR \*  
 \* LOADS \*  
 \* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION \*  
 \* IN CONSIDERATION \*  
 \*\*\*\*\*

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10:13:39 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AHU-1 TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                            |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -161.166                    | 15                      | 7                    | -8.F                 | -412.923                                | 10128.                             | 29.492                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -121.051                    | 3                       | 7                    | -6.F                 | -380.777                                | 9218.                              | 29.492                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -98.088                     | 3                       | 8                    | 12.F                 | -285.406                                | 10032.                             | 29.492                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -29.829                     | 5                       | 7                    | 30.F                 | -197.893                                | 9856.                              | 29.492                          |
| MAY   | 29.41631                    | 30                      | 21                   | 80.F                 | 74.F                                    | -6.597                      | 5                       | 7                    | 44.F                 | -118.576                                | 10128.                             | 29.492                          |
| JUN   | 86.51686                    | 19                      | 19                   | 86.F                 | 75.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 9761.                              | 29.492                          |
| JUL   | 123.17043                   | 17                      | 19                   | 88.F                 | 80.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 10318.                             | 29.492                          |
| AUG   | 115.33618                   | 21                      | 19                   | 95.F                 | 76.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 9937.                              | 29.492                          |
| SEP   | 51.45018                    | 5                       | 19                   | 87.F                 | 76.F                                    | 0.000                       |                         |                      |                      | 0.000                                   | 9951.                              | 29.492                          |
| OCT   | 0.65577                     | 1                       | 19                   | 81.F                 | 66.F                                    | -26.120                     | 20                      | 8                    | 23.F                 | -226.713                                | 10223.                             | 29.492                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -79.999                     | 3                       | 6                    | 13.F                 | -288.265                                | 9666.                              | 29.492                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -142.480                    | 13                      | 8                    | 0.F                  | -368.429                                | 10318.                             | 29.492                          |
| TOTAL | 406.545                     |                         |                      |                      |   | -665.331                    |                         |                      |                      |   | 119543.                            |                                 |
| MAX   |                             |                         |                      |                      | 405.203                                 |                             |                         |                      |                      | -412.923                                |                                    | 29.492                          |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10:13:39 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AHU-1 TOPEKA, KS

| MONTH  | N U M B E R              |                          |                            |                   | H O U R S                  |                            |                     |                           | C O I N C I D E N T       |                                      |  |  | L O A D S  |  |  |  |
|--------|--------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|---------------------|---------------------------|---------------------------|--------------------------------------|--|--|--|--|--|--|
|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0                        | 744                      | 0                          | 0                 | 744                        | 0                          | 744                 | 0                         | 0                         | 0                                    | -186.288   | 11.310   | -186.288   | 11.310   | -186.288   | 11.310   |
| FEB    | 0                        | 672                      | 0                          | 0                 | 672                        | 0                          | 672                 | 0                         | 0                         | 0                                    | -191.095   | 11.310   | -191.095   | 11.310   | -191.095   | 11.310   |
| MAR    | 0                        | 717                      | 0                          | 27                | 744                        | 0                          | 744                 | 0                         | 0                         | 27                                   | -76.927  | 29.492   | -76.927  | 29.492   | -76.927  | 29.492   |
| APR    | 0                        | 566                      | 0                          | 154               | 720                        | 0                          | 720                 | 0                         | 0                         | 154                                  | -20.192  | 11.310   | -20.192  | 11.310   | -20.192  | 11.310   |
| MAY    | 314                      | 232                      | 0                          | 198               | 360                        | 314                        | 744                 | 0                         | 0                         | 198                                  | 0.000  | 23.505   | 0.000  | 23.505   | 0.000  | 23.505   |
| JUN    | 676                      | 0                        | 0                          | 44                | 0                          | 676                        | 720                 | 0                         | 0                         | 44                                   | 0.000  | 23.505   | 0.000  | 23.505   | 0.000  | 23.505   |
| JUL    | 744                      | 0                        | 0                          | 0                 | 0                          | 744                        | 744                 | 0                         | 0                         | 0                                    | 0.000  | 23.505   | 0.000  | 23.505   | 0.000  | 23.505   |
| AUG    | 735                      | 0                        | 0                          | 9                 | 0                          | 735                        | 744                 | 0                         | 0                         | 9                                    | 0.000  | 23.505   | 0.000  | 23.505   | 0.000  | 23.505   |
| SEP    | 474                      | 0                        | 0                          | 246               | 0                          | 474                        | 720                 | 0                         | 0                         | 246                                  | 0.000  | 23.505   | 0.000  | 23.505   | 0.000  | 23.505   |
| OCT    | 7                        | 538                      | 0                          | 199               | 720                        | 7                          | 744                 | 0                         | 0                         | 199                                  | 0.000  | 23.505   | 0.000  | 23.505   | 0.000  | 23.505   |
| NOV    | 0                        | 689                      | 0                          | 31                | 720                        | 0                          | 744                 | 0                         | 0                         | 31                                   | -224.668   | 11.310   | -224.668   | 11.310   | -224.668   | 11.310   |
| DEC    | 0                        | 744                      | 0                          | 0                 | 744                        | 0                          | 744                 | 0                         | 0                         | 0                                    | -127.474   | 29.492   | -127.474   | 29.492   | -127.474   | 29.492   |
| ANNUAL | 2950                     | 4902                     | 0                          | 908               | 5424                       | 2950                       | 8760                | 0                         | 0                         | 908                                  |  |  |  |  |  |  |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10:13:39 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AHU-2 TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                           |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.01382                     | 22                      | 40.F                 | 38.F                 | -14.732                     | 15                      | -6.F                 | -7.F                 | -34.136                                 | 1890.                     | 7.278                           |
| FEB   | 0.08504                     | 26                      | 52.F                 | 41.F                 | -11.118                     | 2                       | 1.F                  | 0.F                  | -31.827                                 | 1742.                     | 7.278                           |
| MAR   | 0.61859                     | 24                      | 65.F                 | 64.F                 | -9.280                      | 3                       | 14.F                 | 12.F                 | -29.962                                 | 1843.                     | 7.278                           |
| APR   | 2.09687                     | 28                      | 71.F                 | 68.F                 | -2.951                      | 5                       | 30.F                 | 27.F                 | -20.561                                 | 1857.                     | 7.278                           |
| MAY   | 5.56339                     | 30                      | 78.F                 | 74.F                 | -0.846                      | 5                       | 44.F                 | 40.F                 | -12.274                                 | 1890.                     | 7.278                           |
| JUN   | 10.54200                    | 19                      | 84.F                 | 75.F                 | -0.066                      | 2                       | 50.F                 | 49.F                 | -6.846                                  | 1810.                     | 7.278                           |
| JUL   | 14.54958                    | 17                      | 88.F                 | 80.F                 | 0.000                       | 4                       | 54.F                 | 53.F                 | 0.000                                   | 1984.                     | 7.278                           |
| AUG   | 13.45136                    | 21                      | 92.F                 | 76.F                 | -0.013                      | 7                       | 40.F                 | 40.F                 | -3.031                                  | 1796.                     | 7.278                           |
| SEP   | 7.26632                     | 5                       | 90.F                 | 77.F                 | -0.721                      | 11                      | 40.F                 | 40.F                 | -9.519                                  | 1904.                     | 7.278                           |
| OCT   | 2.63453                     | 1                       | 83.F                 | 68.F                 | -2.787                      | 20                      | 23.F                 | 22.F                 | -24.282                                 | 1937.                     | 7.278                           |
| NOV   | 0.47483                     | 6                       | 59.F                 | 55.F                 | -7.365                      | 3                       | 13.F                 | 12.F                 | -30.542                                 | 1763.                     | 7.278                           |
| DEC   | 0.12957                     | 3                       | 49.F                 | 42.F                 | -13.002                     | 13                      | 2.F                  | 1.F                  | -31.360                                 | 1984.                     | 7.278                           |
| TOTAL | 57.426                      |                         |                      |                      | -62.881                     |                         |                      |                      | -34.136                                 | 22402.                    | 7.278                           |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10:13:39 SDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AHU-2 TOPEKA, KS

| MONTH  | N U M B E R O F H O U R S |                          |  |                   |                            |                            |                              |                           |                                      |  | --COINCIDENT LOADS--                           |  |
|--------|---------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|--|
|        | HOURS<br>COOLING<br>LOAD  | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |
| JAN    | 16                        | 728                      | 0  | 0                 | 744                        | 744                        | 744                          | 0                         | 0                                    | 0.000  | 7.278  |  |
| FEB    | 30                        | 642                      | 0  | 0                 | 672                        | 672                        | 672                          | 0                         | 0                                    | 0.000  | 7.278  |  |
| MAR    | 92                        | 652                      | 0  | 0                 | 744                        | 744                        | 744                          | 0                         | 0                                    | 0.000  | 7.278  |  |
| APR    | 279                       | 441                      | 0  | 0                 | 720                        | 720                        | 720                          | 0                         | 0                                    | 0.000  | 7.278  |  |
| MAY    | 529                       | 215                      | 0  | 0                 | 744                        | 744                        | 744                          | 0                         | 0                                    | 0.000  | 7.278  |  |
| JUN    | 689                       | 31                       | 0  | 0                 | 720                        | 720                        | 720                          | 0                         | 0                                    | 0.000  | 7.278  |  |
| JUL    | 744                       | 0                        | 0  | 0                 | 744                        | 744                        | 744                          | 0                         | 0                                    | 0.000  | 7.278  |  |
| AUG    | 735                       | 9                        | 0  | 0                 | 744                        | 744                        | 744                          | 0                         | 0                                    | 0.000  | 7.278  |  |
| SEP    | 555                       | 165                      | 0  | 0                 | 720                        | 720                        | 720                          | 0                         | 0                                    | 0.000  | 7.278  |  |
| OCT    | 301                       | 443                      | 0  | 0                 | 744                        | 744                        | 744                          | 0                         | 0                                    | 0.000  | 7.278  |  |
| NOV    | 109                       | 611                      | 0  | 0                 | 720                        | 720                        | 720                          | 0                         | 0                                    | 0.000  | 7.278  |  |
| DEC    | 54                        | 690                      | 0  | 0                 | 744                        | 744                        | 744                          | 0                         | 0                                    | 0.000  | 7.278  |  |
| ANNUAL | 4133                      | 4627                     | 0  | 0                 | 8760                       | 8760                       | 8760                         | 0                         | 0                                    |  |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10:13:39 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>48.858<br>139.928<br>8/17 | NATURAL-GAS<br>245.745<br>559.939<br>15/7 |
|-----|--|--|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 44.462<br>139.399<br>20/17               | 191.132<br>526.553<br>3/7                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 47.949<br>138.892<br>24/17               | 161.473<br>421.329<br>3/8                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 45.330<br>140.738<br>28/17               | 54.826<br>312.255<br>5/7                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 58.767<br>229.335<br>30/24               | 13.913<br>210.030<br>5/7                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 80.733<br>235.404<br>19/17               | 0.302<br>17.435<br>2/7                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 97.641<br>265.514<br>23/17               | 0.000<br>0.000<br>31/1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 94.553<br>255.682<br>21/17               | 0.078<br>11.201<br>4/7                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 67.166<br>238.327<br>5/17                | 2.209<br>21.804<br>11/7                   |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 47.328<br>180.544<br>1/24                | 49.255<br>349.363<br>20/8                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 45.561<br>139.746<br>5/17                | 133.408<br>425.181<br>3/6                 |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 49.849<br>140.416<br>16/17               | 221.470<br>513.028<br>13/8                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |  |   |
|     | ONE YEAR<br>USE/PEAK                             | 728.196<br>265.514                       | 1073.813<br>559.939                       |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10:13:39 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 38.10       | 1073.81     |
| SPACE COOL                                       | 193.23      | 0.00        |
| HVAC AUX   | 392.49      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 62.50       | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 41.86       | 0.00        |
| TOTAL  | 728.17      | 1073.81     |

TOTAL SITE ENERGY 1802.01 MBTU 213.3 KBTU/SQFT-YR GROSS-AREA 213.3 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 3260.59 MBTU 385.9 KBTU/SQFT-YR GROSS-AREA 385.9 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 4.8  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

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$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
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## \$ GENERAL PROJECT DATA

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TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

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        LINE-4 *RUN #1 NIGHT SETBACK FOR BLDG. #7866      *
        LINE-5 *THEATER W/DRESS RM                        * ..

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ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE  (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..
SD_WT_HT   =DAY-SCHEDULE  (1,16) (55.)
                (17,24) (74.) ..
SD_SM_CL   =DAY-SCHEDULE  (1,16) (85.)
                (17,24) (72.) ..
SD_WT_CL   =DAY-SCHEDULE  (1,16) (55.2)
                (17,24) (74.2) ..
SD_SM_HT   =DAY-SCHEDULE  (1,16) (84.8)
                (17,24) (71.8) ..
SD_FAN_CYC =DAY-SCHEDULE  (1,6) (-1.)
                (7,16) (0.)
                (17,24) (1.) ..
SD_WT_HT_D =DAY-SCHEDULE  (1,24) (55.) ..
SD_WT_CL_D =DAY-SCHEDULE  (1,24) (55.2) ..
SD_SM_CL_D =DAY-SCHEDULE  (1,24) (85.) ..
SD_SM_HT_D =DAY-SCHEDULE  (1,24) (84.8) ..

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SW_ON      =WEEK-SCHEDULE  (ALL) SD_ON ..
SW_OFF     =WEEK-SCHEDULE  (ALL) SD_OFF ..

SW_WT_HT   =WEEK-SCHEDULE  (MON) SD_WT_HT_D
                (TUE) SD_WT_HT_D
                (WED) SD_WT_HT_D
                (THU) SD_WT_HT
                (FRI) SD_WT_HT
                (SAT) SD_WT_HT
                (SUN) SD_WT_HT
                (HOL) SD_WT_HT ..

SW_SM_CL   =WEEK-SCHEDULE  (MON) SD_SM_CL_D
                (TUE) SD_SM_CL_D
                (WED) SD_SM_CL_D

```

(THU) SD\_SM\_CL  
 (FRI) SD\_SM\_CL  
 (SAT) SD\_SM\_CL  
 (SUN) SD\_SM\_CL  
 (HOL) SD\_SM\_CL ..

SW\_WT\_CL =WEEK-SCHEDULE (MON) SD\_WT\_CL\_D  
 (TUE) SD\_WT\_CL\_D  
 (WED) SD\_WT\_CL\_D  
 (THU) SD\_WT\_CL  
 (FRI) SD\_WT\_CL  
 (SAT) SD\_WT\_CL  
 (SUN) SD\_WT\_CL  
 (HOL) SD\_WT\_CL ..

SW\_SM\_HT =WEEK-SCHEDULE (MON) SD\_SM\_HT\_D  
 (TUE) SD\_SM\_HT\_D  
 (WED) SD\_SM\_HT\_D  
 (THU) SD\_SM\_HT  
 (FRI) SD\_SM\_HT  
 (SAT) SD\_SM\_HT  
 (SUN) SD\_SM\_HT  
 (HOL) SD\_SM\_HT ..

SW\_FAN\_CYC =WEEK-SCHEDULE (MON) SD\_OFF  
 (TUE) SD\_OFF  
 (WED) SD\_OFF  
 (THU) SD\_FAN\_CYC  
 (FRI) SD\_FAN\_CYC  
 (SAT) SD\_FAN\_CYC  
 (SUN) SD\_FAN\_CYC  
 (HOL) SD\_FAN\_CYC ..

## \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F = SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

S\_HRLY\_RPT = SCHEDULE THRU JAN 9 SW\_OFF  
 THRU JAN 10 SW\_ON  
 THRU JAN 22 SW\_OFF  
 THRU JAN 23 SW\_ON  
 THRU JUL 18 SW\_OFF  
 THRU JUL 19 SW\_ON  
 THRU JUL 22 SW\_OFF  
 THRU JUL 23 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYCL = SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..


# \$ ZONE DESCRIPTION

THEATER =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

LOBBY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

PROJ-ROOM =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

# \$ SYSTEM DESCRIPTION

AHU-1 =SYSTEM SYSTEM-TYPE = SZRH  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED HEAT-SET-T = 55.0  
 PREHEAT-T = 0.0 OA-CONTROL = FIXED  
 SUPPLY-CFM = 14500. RATED-CFM = 14500.  
 MIN-OUTSIDE-AIR = 0.17 MAX-OA-FRACTION = 0.17  
 FAN-SCHEDULE = S\_FAN\_CYCL SUPPLY-DELTA-T = 2.4  
 SUPPLY-KW = 0.00078 FAN-PLACEMENT = BLOW-THROUGH  
NIGHT-CYCLE-CTRL = CYCLE-ON-ANY NIGHT-VENT-DT = 0.0   
 MIN-CFM-RATIO = 1.0 REHEAT-DELTA-T = 27.8  
 COOLING-CAPACITY = 453656. COOL-SH-CAP = 380832.  
 HEATING-CAPACITY = -417300.  
 SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (THEATER, LOBBY) ..

AHU-2       =SYSTEM    SYSTEM-TYPE = SZRH  
                   MAX-SUPPLY-T = 120.0   MIN-SUPPLY-T = 55.0  
                   HEATING-SCHEDULE = S\_ON   COOLING-SCHEDULE = S\_ON  
                   HEAT-SET-T = 55.0   PREHEAT-T = 0.0  
                   OA-CONTROL = FIXED   SUPPLY-CFM = 1800.  
                   RATED-CFM = 1800.   MIN-OUTSIDE-AIR = 0.17  
                   MAX-OA-FRACTION = 0.17   FAN-SCHEDULE = S\_FAN\_CYCL  
                   SUPPLY-DELTA-T = 2.4   SUPPLY-KW = 0.00078  
                   FAN-PLACEMENT = BLOW-THROUGH  
                   NIGHT-CYCLE-CTRL = CYCLE-ON-ANY   NIGHT-VENT-DT = 0.0  
                   MIN-CFM-RATIO = 1.0   REHEAT-DELTA-T = 17.  
                   COOLING-CAPACITY = 48900.   COOL-SH-CAP = 48900.  
                   HEATING-CAPACITY = -30709.3  
                   ZONE-HEAT-SOURCE = ELECTRIC  
                   SIZING-OPTION = COINCIDENT   RETURN-AIR-PATH = DUCT  
                   ZONE-NAMES = (PROJ-ROOM) ..

## \$ HOURLY REPORT DESCRIPTION

THEAT-BLK   =REPORT-BLOCK VARIABLE-TYPE = THEATER  
                   VARIABLE-LIST = (17,18,7,6) ..  
 LOBBY-BLK   =REPORT-BLOCK VARIABLE-TYPE = LOBBY  
                   VARIABLE-LIST = (17,18,7,6) ..  
 PROJ-BLK    =REPORT-BLOCK VARIABLE-TYPE = PROJ-ROOM  
                   VARIABLE-LIST = (17,18,7,6) ..  
 AHU-1-BLK   =REPORT-BLOCK VARIABLE-TYPE = AHU-1  
                   VARIABLE-LIST = (3,5,6,17,39) ..  
 AHU-2-BLK   =REPORT-BLOCK VARIABLE-TYPE = AHU-2  
                   VARIABLE-LIST = (3,5,6,17,39) ..  
 ZONES-HRLY = HOURLY-REPORT   REPORT-SCHEDULE = S\_HRLY\_RPT  
                   REPORT-BLOCK = (THEAT-BLK, LOBBY-BLK, PROJ-BLK)  
 ..  
 AHU-HRLY    = HOURLY-REPORT   REPORT-SCHEDULE = S\_HRLY\_RPT  
                   REPORT-BLOCK = (AHU-1-BLK, AHU-2-BLK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E   P L A N T S   I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE   LINE-1 \*    EMC       ENGINEERS       INC.       \*  
           LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
           LINE-3 \*    DENVER,       CO       80227       \*  
           LINE-4 \*RUN #1 NIGHT SETBACK FOR BLDG. #7866       \*  
           LINE-5 \*THEATER W/DRESS RM                       \* ..

| EMC ENGINEERS INC. 80227 E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9: 3:30 SDL RUN 1 |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
|--|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
| DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #7866 THEATER W/DRESS RM                             |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AHU-1 TOPEKA, KS                                       |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----  |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN  | 0.00000                     |                         |                      |                      | 0.000                                   | -68.261                     | 14 18                   | -1.1 F               | -2. F                | -421.309                                | 8239.                     | 29.492                          |
| FEB  | 0.00000                     |                         |                      |                      | 0.000                                   | -46.591                     | 3 18                    | 21.1 F               | 18. F                | -387.485                                | 7589.                     | 29.492                          |
| MAR  | 0.00000                     |                         |                      |                      | 0.000                                   | -29.776                     | 3 18                    | 28. F                | 23. F                | -352.398                                | 8506.                     | 29.492                          |
| APR  | 0.00000                     |                         |                      |                      | 0.000                                   | -4.338                      | 14 17                   | 51. F                | 42. F                | -194.999                                | 8556.                     | 29.492                          |
| MAY  | 16.35864                    | 22 19                   | 77. F                | 70. F                | 312.888                                 | -0.421                      | 5 17                    | 65. F                | 52. F                | -81.935                                 | 8883.                     | 29.492                          |
| JUN  | 40.97293                    | 30 17                   | 88. F                | 73. F                | 401.125                                 | 0.000                       |                         |                      |                      | 0.000                                   | 8494.                     | 29.492                          |
| JUL  | 58.98399                    | 17 19                   | 88. F                | 80. F                | 438.144                                 | 0.000                       |                         |                      |                      | 0.000                                   | 8870.                     | 29.492                          |
| AUG  | 50.94439                    | 11 17                   | 98. F                | 71. F                | 415.223                                 | 0.000                       |                         |                      |                      | 0.000                                   | 8478.                     | 29.492                          |
| SEP  | 29.03647                    | 8 17                    | 89. F                | 72. F                | 383.721                                 | 0.000                       |                         |                      |                      | 0.000                                   | 8572.                     | 29.492                          |
| OCT  | 0.78622                     | 1 19                    | 81. F                | 66. F                | 128.539                                 | -3.645                      | 20 17                   | 52. F                | 43. F                | -281.855                                | 8888.                     | 29.492                          |
| NOV  | 0.00000                     |                         |                      |                      | 0.000                                   | -22.794                     | 3 18                    | 44. F                | 35. F                | -302.685                                | 8162.                     | 29.492                          |
| DEC  | 0.00000                     |                         |                      |                      | 0.000                                   | -61.287                     | 8 18                    | 14. F                | 11. F                | -385.112                                | 8452.                     | 29.492                          |
| TOTAL  | 197.083                     |                         |                      |                      | 438.144                                 | -237.112                    |                         |                      |                      | -421.309                                | 101693.                   | 29.492                          |
| MAX  |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |

| EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9: 3:30 SDL RUN 1 |                          |                          |  |                   |                            |                            |                  |                   |                           |                                      |  |  |
|--|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------|-------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #7866 THEATER W/DRESS RM                       |                          |                          |  |                   |                            |                            |                  |                   |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AHU-1 TOPEKA, KS                                    |                          |                          |  |                   |                            |                            |                  |                   |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----  |                          |                          |  |                   |                            |                            |                  |                   |                           |                                      |  |  |
| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON | HOURS<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN  | 0                        | 540                      | 0  | 204               | 744                        | 0                          | 577              | 433               | 0                         | 37                                   | 0.000  | 0.000  |
| FEB  | 0                        | 483                      | 0  | 189               | 672                        | 0                          | 528              | 392               | 0                         | 45                                   | -45.170  | 11.310   |
| MAR  | 0                        | 487                      | 0  | 257               | 744                        | 0                          | 609              | 473               | 0                         | 122                                  | -142.147   | 29.492   |
| APR  | 0                        | 301                      | 0  | 419               | 720                        | 0                          | 605              | 461               | 0                         | 304                                  | 0.000  | 0.000  |
| MAY  | 80                       | 130                      | 0  | 534               | 360                        | 137                        | 634              | 490               | 0                         | 424                                  | 0.000  | 23.505   |
| JUN  | 218                      | 0                        | 0  | 502               | 0                          | 330                        | 608              | 472               | 0                         | 390                                  | 0.000  | 29.492   |
| JUL  | 266                      | 0                        | 0  | 478               | 0                          | 394                        | 616              | 456               | 0                         | 350                                  | 0.000  | 23.505   |
| AUG  | 291                      | 0                        | 0  | 453               | 0                          | 420                        | 615              | 487               | 0                         | 324                                  | 0.000  | 29.492   |
| SEP  | 165                      | 0                        | 0  | 555               | 0                          | 287                        | 598              | 446               | 0                         | 433                                  | 0.000  | 29.492   |
| OCT  | 7                        | 339                      | 0  | 398               | 720                        | 13                         | 626              | 474               | 0                         | 280                                  | 0.000  | 23.505   |
| NOV  | 0                        | 424                      | 0  | 296               | 720                        | 0                          | 587              | 459               | 0                         | 163                                  | 0.000  | 0.000  |
| DEC  | 0                        | 536                      | 0  | 208               | 744                        | 0                          | 579              | 419               | 0                         | 43                                   | -175.869   | 29.492   |
| ANNUAL   | 1027                     | 3240                     | 0  | 4493              | 5424                       | 1581                       | 7182             | 5462              | 0                         | 2915                                 |  |  |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9: 3:30 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AHU-2 TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                            |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.25016                     | 24                      | 1                    | 36.F                 | 35.F                                    | -4.731                      | 14                      | 21                   | -3.F                 | -4.F                                    | 1447.                              | 7.278                           |
| FEB   | 0.28104                     | 14                      | 1                    | 32.F                 | 31.F                                    | -2.929                      | 3                       | 10                   | 10.F                 | 8.F                                     | 1325.                              | 7.278                           |
| MAR   | 1.14126                     | 28                      | 1                    | 46.F                 | 42.F                                    | -1.781                      | 3                       | 18                   | 28.F                 | 23.F                                    | 1439.                              | 7.278                           |
| APR   | 4.85503                     | 29                      | 7                    | 62.F                 | 61.F                                    | -0.163                      | 14                      | 17                   | 51.F                 | 42.F                                    | 1635.                              | 7.278                           |
| MAY   | 5.74571                     | 30                      | 18                   | 86.F                 | 75.F                                    | -0.833                      | 19                      | 7                    | 50.F                 | 49.F                                    | 1539.                              | 7.278                           |
| JUN   | 4.99110                     | 30                      | 18                   | 86.F                 | 73.F                                    | -0.760                      | 11                      | 7                    | 58.F                 | 56.F                                    | 1320.                              | 7.278                           |
| JUL   | 6.69658                     | 17                      | 18                   | 88.F                 | 80.F                                    | -0.379                      | 29                      | 7                    | 59.F                 | 58.F                                    | 1485.                              | 7.278                           |
| AUG   | 5.65014                     | 21                      | 17                   | 95.F                 | 77.F                                    | -0.372                      | 26                      | 7                    | 65.F                 | 63.F                                    | 1288.                              | 7.278                           |
| SEP   | 4.28277                     | 5                       | 18                   | 90.F                 | 77.F                                    | -1.685                      | 11                      | 8                    | 43.F                 | 42.F                                    | 1423.                              | 7.278                           |
| OCT   | 5.69723                     | 1                       | 18                   | 83.F                 | 68.F                                    | -0.265                      | 1                       | 8                    | 47.F                 | 45.F                                    | 1711.                              | 7.278                           |
| NOV   | 1.96935                     | 7                       | 1                    | 59.F                 | 56.F                                    | -1.414                      | 3                       | 8                    | 24.F                 | 21.F                                    | 1407.                              | 7.278                           |
| DEC   | 0.43146                     | 19                      | 1                    | 42.F                 | 37.F                                    | -3.941                      | 8                       | 20                   | 14.F                 | 11.F                                    | 1556.                              | 7.278                           |
| TOTAL | 41.992                      |                         |                      |                      |   | -19.253                     |                         |                      |                      |   | 17576.                             |                                 |
| MAX   |                             |                         |                      |                      | 50.459                                  |                             |                         |                      |                      | -29.260                                 |                                    | 7.278                           |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9: 3:30 SDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AHU-2 TOPEKA, KS

| MONTH  | H O U R S                |                          |                            |                   | C O I N C I D E N T        |                            |                     |                     | H E A T I N G        |                           |   |  | E L E C                                       |                                 |
|--------|--------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|---------------------|---------------------|----------------------|---------------------------|---|--|---|---------------------------------|
|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>ON | HOURS<br>CYCLE<br>ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS<br>ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN    | 80                       | 348                      | 0                          | 316               | 744                        | 744                        | 428                 | 284                 | 0                    | 0                         | 0                                       | 0.000  | 1.404   | 1.404                           |
| FEB    | 78                       | 297                      | 0                          | 297               | 672                        | 672                        | 375                 | 239                 | 0                    | 0                         | 0                                       | 0.000  | 1.404   | 1.404                           |
| MAR    | 213                      | 242                      | 0                          | 289               | 744                        | 744                        | 456                 | 320                 | 0                    | 0                         | 0                                       | 0.000  | 1.404   | 1.404                           |
| APR    | 513                      | 49                       | 0                          | 158               | 720                        | 720                        | 562                 | 418                 | 0                    | 0                         | 0                                       | 0.000  | 1.404   | 1.404                           |
| MAY    | 368                      | 126                      | 0                          | 250               | 744                        | 744                        | 494                 | 350                 | 0                    | 0                         | 0                                       | 0.000  | 7.278   | 7.278                           |
| JUN    | 213                      | 158                      | 0                          | 349               | 720                        | 720                        | 371                 | 235                 | 0                    | 0                         | 0                                       | 0.000  | 7.278   | 7.278                           |
| JUL    | 260                      | 128                      | 0                          | 356               | 744                        | 744                        | 388                 | 228                 | 0                    | 0                         | 0                                       | 0.000  | 7.278   | 7.278                           |
| AUG    | 274                      | 108                      | 0                          | 362               | 744                        | 744                        | 382                 | 254                 | 0                    | 0                         | 0                                       | 0.000  | 7.278   | 7.278                           |
| SEP    | 179                      | 199                      | 0                          | 342               | 720                        | 720                        | 378                 | 226                 | 0                    | 0                         | 0                                       | 0.000  | 7.278   | 7.278                           |
| OCT    | 540                      | 43                       | 0                          | 161               | 744                        | 744                        | 583                 | 431                 | 0                    | 0                         | 0                                       | 0.000  | 7.278   | 7.278                           |
| NOV    | 281                      | 186                      | 0                          | 253               | 720                        | 720                        | 467                 | 339                 | 0                    | 0                         | 0                                       | 0.000  | 1.404   | 1.404                           |
| DEC    | 107                      | 332                      | 0                          | 305               | 744                        | 744                        | 439                 | 279                 | 0                    | 0                         | 0                                       | 0.000  | 1.404   | 1.404                           |
| ANNUAL | 3106                     | 2216                     | 0                          | 3438              | 8760                       | 8760                       | 5323                | 3603                | 0                    | 0                         | 1                                       |  |   |                                 |

EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9: 3:30 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #1 NIGHT SETBACK FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- PS-B TOPEKA, KS

| MO  | UTILITY -<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>37.627<br>136.184<br>30/24 | NATURAL-GAS<br>106.720<br>564.963<br>14/18 |
|-----|---|---|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 34.241<br>136.696<br>26/24                | 75.502<br>528.309<br>3/18                  |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 38.176<br>139.127<br>6/24                 | 51.033<br>489.891<br>3/18                  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 40.374<br>137.726<br>28/24                | 9.169<br>299.988<br>14/17                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 45.896<br>231.934<br>30/24                | 3.644<br>148.507<br>5/17                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 50.765<br>270.808<br>30/17                | 2.239<br>31.966<br>11/ 7                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 58.651<br>289.322<br>23/17                | 1.426<br>24.629<br>29/ 7                   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 55.769<br>290.235<br>11/17                | 1.288<br>23.668<br>26/ 7                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 47.161<br>268.508<br>8/17                 | 4.008<br>42.481<br>11/ 8                   |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 42.588<br>187.094<br>1/24                 | 8.222<br>398.007<br>20/17                  |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 37.069<br>136.768<br>20/24                | 39.471<br>429.419<br>3/18                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              | 39.015<br>137.210<br>18/24                | 98.233<br>523.764<br>8/18                  |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR              |   |  |
|     | ONE YEAR<br>USE/PEAK                              | 527.331<br>290.235                        | 400.954<br>564.963                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9: 3:30 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SETBACK FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 15.77       | 400.95      |
| SPACE COOL      | 93.99       | 0.00        |
| HVAC AUX        | 313.21      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 62.50       | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 41.86       | 0.00        |
| TOTAL           | 527.31      | 400.95      |

TOTAL SITE ENERGY 928.28 MBTU 109.9 KBTU/SQFT-YR GROSS-AREA 109.9 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1984.53 MBTU 234.9 KBTU/SQFT-YR GROSS-AREA 234.9 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 27.4  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

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$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

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## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

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        LINE-4 *RUN #2 DDC CONTROL FOR BLDG. #7866      *

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        LINE-5 *THEATER W/DRESS RM                      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
SD_WT_HT   =DAY-SCHEDULE (1,24) (70.) ..
SD_SM_CL   =DAY-SCHEDULE (1,24) (76.) ..
SD_WT_CL   =DAY-SCHEDULE (1,24) (70.2) ..
SD_SM_HT   =DAY-SCHEDULE (1,24) (75.8) ..

```

```

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..
SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..
SW_WT_HT   =WEEK-SCHEDULE (ALL) SD_WT_HT ..
SW_SM_CL   =WEEK-SCHEDULE (ALL) SD_SM_CL ..
SW_WT_CL   =WEEK-SCHEDULE (ALL) SD_WT_CL ..
SW_SM_HT   =WEEK-SCHEDULE (ALL) SD_SM_HT ..

```

## \$ FULL ON SYSTEM

```

S_ON      =SCHEDULE THRU DEC 31 SW_ON ..

```

## \$ FULL OFF SYSTEM

```

S_OFF     =SCHEDULE THRU DEC 31 SW_OFF ..

```

## \$ HEATING SEASON

```

S_HE-SCHED =SCHEDULE THRU MAY 15 SW_ON
                THRU OCT 1 SW_OFF
                THRU DEC 31 SW_ON ..

```

## \$ COOLING SEASON

```

S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
                THRU OCT 1 SW_ON

```

THRU DEC 31 SW\_OFF ..

\$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

\$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_HRLY\_RPT =SCHEDULE THRU JAN 9 SW\_OFF  
THRU JAN 10 SW\_ON  
THRU JAN 22 SW\_OFF  
THRU JAN 23 SW\_ON  
THRU JUL 18 SW\_OFF  
THRU JUL 19 SW\_ON  
THRU JUL 22 SW\_OFF  
THRU JUL 23 SW\_ON  
THRU DEC 31 SW\_OFF ..

\$ ZONE DESCRIPTION

THEATER =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

LOBBY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

PROJ-ROOM =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

\$ SYSTEM DESCRIPTION

AHU-1 =SYSTEM SYSTEM-TYPE = SZRH  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE-SCHED  
COOLING-SCHEDULE = S\_CL\_SCHED HEAT-SET-T = 55.0  
PREHEAT-T = 0.0 OA-CONTROL = FIXED  
SUPPLY-CFM = 14500. RATED-CFM = 14500.  
MIN-OUTSIDE-AIR = 0.17 MAX-OA-FRACTION = 0.17  
SUPPLY-DELTA-T = 2.4 SUPPLY-KW = 0.00078  
FAN-PLACEMENT = BLOW-THROUGH

NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0 REHEAT-DELTA-T = 27.8  
 COOLING-CAPACITY = 453656. COOL-SH-CAP = 380832.  
 HEATING-CAPACITY = -417300.  
 SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (THEATER, LOBBY) ..

AHU-2 =SYSTEM SYSTEM-TYPE = SZRH  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_ON COOLING-SCHEDULE = S\_ON  
 HEAT-SET-T = 55.0 PREHEAT-T = 0.0  
 OA-CONTROL = FIXED SUPPLY-CFM = 1800.  
 RATED-CFM = 1800. MIN-OUTSIDE-AIR = 0.17  
 MAX-OA-FRACTION = 0.17 SUPPLY-DELTA-T = 2.4  
 SUPPLY-KW = 0.00078 FAN-PLACEMENT = BLOW-THROUGH  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0 REHEAT-DELTA-T = 17.  
 COOLING-CAPACITY = 48900. COOL-SH-CAP = 48900.  
 HEATING-CAPACITY = -30709.3  
 ZONE-HEAT-SOURCE = ELECTRIC  
 SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (PROJ-ROOM) ..

## \$ HOURLY REPORT DESCRIPTION

THEAT-BLK =REPORT-BLOCK VARIABLE-TYPE = THEATER  
 VARIABLE-LIST = (17,18,7,6) ..  
 LOBBY-BLK =REPORT-BLOCK VARIABLE-TYPE = LOBBY  
 VARIABLE-LIST = (17,18,7,6) ..  
 PROJ-BLK =REPORT-BLOCK VARIABLE-TYPE = PROJ-ROOM  
 VARIABLE-LIST = (17,18,7,6) ..  
 AHU-1-BLK =REPORT-BLOCK VARIABLE-TYPE = AHU-1  
 VARIABLE-LIST = (3,5,6,17,39) ..  
 AHU-2-BLK =REPORT-BLOCK VARIABLE-TYPE = AHU-2  
 VARIABLE-LIST = (3,5,6,17,39) ..  
 ZONES-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY\_RPT  
 REPORT-BLOCK = (THEAT-BLK, LOBBY-BLK, PROJ-BLK)  
 ..  
 AHU-HRLY = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY\_RPT  
 REPORT-BLOCK = (AHU-1-BLK, AHU-2-BLK)  
 ..  
 END ..  
 COMPUTE SYSTEMS ..  
 INPUT PLANT ..

\$-----\$  
 \$ E Z - D O E P L A N T S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*

EMC ENGINEERS INC. EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9:19:58 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AHU-1 TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                   |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -111.924                    | 15                      | 8                    | -6.F                 | -7.F                                    | 10128.                    | 29.492                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -80.723                     | 3                       | 7                    | -5.F                 | -6.F                                    | 9218.                     | 29.492                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -60.581                     | 3                       | 8                    | 15.F                 | 12.F                                    | 10032.                    | 29.492                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -12.501                     | 5                       | 7                    | 30.F                 | 27.F                                    | 9856.                     | 29.492                          |
| MAY   | 21.38521                    | 30                      | 21                   | 80.F                 | 74.F                                    | -1.533                      | 5                       | 7                    | 44.F                 | 40.F                                    | 10128.                    | 29.492                          |
| JUN   | 62.46119                    | 19                      | 19                   | 86.F                 | 75.F                                    | 0.000                       |                         |                      |                      |   | 9761.                     | 29.492                          |
| JUL   | 90.89182                    | 17                      | 19                   | 88.F                 | 80.F                                    | 0.000                       |                         |                      |                      |   | 10318.                    | 29.492                          |
| AUG   | 85.14179                    | 21                      | 19                   | 95.F                 | 76.F                                    | 0.000                       |                         |                      |                      |   | 9937.                     | 29.492                          |
| SEP   | 36.06384                    | 5                       | 19                   | 87.F                 | 76.F                                    | 0.000                       |                         |                      |                      |   | 9951.                     | 29.492                          |
| OCT   | 0.26714                     | 1                       | 24                   | 64.F                 | 60.F                                    | -9.539                      | 20                      | 8                    | 23.F                 | 22.F                                    | 10223.                    | 29.492                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -46.770                     | 3                       | 6                    | 13.F                 | 12.F                                    | 9666.                     | 29.492                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -96.368                     | 13                      | 8                    | 0.F                  | -1.F                                    | 10318.                    | 29.492                          |
| TOTAL | 296.211                     |                         |                      |                      |   | -419.938                    |                         |                      |                      |   | 119543.                   |                                 |
| MAX   |                             |                         |                      |                      | 327.345                                 |                             |                         |                      |                      | -313.024                                |                           | 29.492                          |

EMC ENGINEERS INC. EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9:19:58 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AHU-1 TOPEKA, KS

| MONTH  | HOURS           |                 |                                 |          | N U M B E R                |                            |                              |                           | H O U R S                 |                                      |  |  | C O I N C I D E N T                                |  |  |  | L O A D S  |  |  |  |
|--------|-----------------|-----------------|---------------------------------|----------|----------------------------|----------------------------|------------------------------|---------------------------|---------------------------|--------------------------------------|--|--|--|--|--|--|--|--|--|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COINCIDENT<br>COOL-HEAT<br>LOAD | FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN | PEAK<br>COOLING<br>PEAK<br>(KBTU/HR) | PEAK<br>ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | COINCIDENT<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | COINCIDENT<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | COINCIDENT<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | COINCIDENT<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | COINCIDENT<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | COINCIDENT<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | COINCIDENT<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0               | 744             | 0                               | 0        | 744                        | 0                          | 744                          | 0                         | 0                         | -126.342                             | 11.310   | -126.342   | -126.342   | -126.342   | 11.310   | 11.310   | 11.310   | 11.310   | 11.310   | 11.310   |
| FEB    | 0               | 662             | 0                               | 10       | 672                        | 0                          | 672                          | 0                         | 10                        | -130.280                             | 11.310   | -130.280   | -130.280   | -130.280   | 11.310   | 11.310   | 11.310   | 11.310   | 11.310   | 11.310   |
| MAR    | 0               | 681             | 0                               | 63       | 744                        | 0                          | 744                          | 0                         | 63                        | -16.891                              | 29.492   | -16.891  | -16.891  | -16.891  | 29.492   | 29.492   | 29.492   | 29.492   | 29.492   | 29.492   |
| APR    | 0               | 471             | 0                               | 249      | 720                        | 0                          | 720                          | 0                         | 249                       | -19.905                              | 11.310   | -19.905  | -19.905  | -19.905  | 11.310   | 11.310   | 11.310   | 11.310   | 11.310   | 11.310   |
| MAY    | 267             | 192             | 0                               | 285      | 360                        | 267                        | 744                          | 0                         | 285                       | 0.000                                | 23.505   | 0.000  | 0.000  | 0.000  | 23.505   | 23.505   | 23.505   | 23.505   | 23.505   | 23.505   |
| JUN    | 646             | 0               | 0                               | 74       | 0                          | 646                        | 720                          | 0                         | 74                        | 0.000                                | 23.505   | 0.000  | 0.000  | 0.000  | 23.505   | 23.505   | 23.505   | 23.505   | 23.505   | 23.505   |
| JUL    | 744             | 0               | 0                               | 0        | 0                          | 744                        | 744                          | 0                         | 0                         | 0.000                                | 23.505   | 0.000  | 0.000  | 0.000  | 23.505   | 23.505   | 23.505   | 23.505   | 23.505   | 23.505   |
| AUG    | 733             | 0               | 0                               | 11       | 0                          | 733                        | 744                          | 0                         | 11                        | 0.000                                | 23.505   | 0.000  | 0.000  | 0.000  | 23.505   | 23.505   | 23.505   | 23.505   | 23.505   | 23.505   |
| SEP    | 425             | 0               | 0                               | 295      | 0                          | 425                        | 720                          | 0                         | 295                       | 0.000                                | 23.505   | 0.000  | 0.000  | 0.000  | 23.505   | 23.505   | 23.505   | 23.505   | 23.505   | 23.505   |
| OCT    | 5               | 461             | 0                               | 278      | 720                        | 5                          | 744                          | 0                         | 278                       | 0.000                                | 23.505   | 0.000  | 0.000  | 0.000  | 23.505   | 23.505   | 23.505   | 23.505   | 23.505   | 23.505   |
| NOV    | 0               | 630             | 0                               | 90       | 720                        | 0                          | 720                          | 0                         | 90                        | -158.619                             | 11.310   | -158.619   | -158.619   | -158.619   | 11.310   | 11.310   | 11.310   | 11.310   | 11.310   | 11.310   |
| DEC    | 0               | 731             | 0                               | 13       | 744                        | 0                          | 744                          | 0                         | 13                        | -63.895                              | 29.492   | -63.895  | -63.895  | -63.895  | 29.492   | 29.492   | 29.492   | 29.492   | 29.492   | 29.492   |
| ANNUAL | 2820            | 4572            | 0                               | 1368     | 5424                       | 2820                       | 8760                         | 0                         | 1368                      |                                      |  |  |  |  |  |  |  |  |  |  |

EMC ENGINEERS INC. EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9:19:58 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AHU-2 TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |                           |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.27998                     | 22 24                   | 40.F                 | 38.F                 | -10.316                     | 15 6                    | -8.F                 | -9.F                 | -30.921                                 | 1890.                     | 7.278                           |
| FEB   | 0.47266                     | 26 24                   | 43.F                 | 37.F                 | -7.389                      | 3 7                     | -5.F                 | -6.F                 | -30.442                                 | 1742.                     | 7.278                           |
| MAR   | 1.11419                     | 24 18                   | 65.F                 | 64.F                 | -5.796                      | 3 8                     | 15.F                 | 12.F                 | -21.892                                 | 1843.                     | 7.278                           |
| APR   | 3.23906                     | 28 19                   | 71.F                 | 68.F                 | -1.379                      | 5 7                     | 30.F                 | 27.F                 | -14.150                                 | 1857.                     | 7.278                           |
| MAY   | 5.32427                     | 30 23                   | 78.F                 | 74.F                 | -0.394                      | 5 7                     | 44.F                 | 40.F                 | -7.294                                  | 1890.                     | 7.278                           |
| JUN   | 7.99071                     | 19 20                   | 84.F                 | 75.F                 | -0.084                      | 2 7                     | 50.F                 | 49.F                 | -6.584                                  | 1810.                     | 7.278                           |
| JUL   | 11.12780                    | 17 19                   | 88.F                 | 80.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 1984.                     | 7.278                           |
| AUG   | 10.23586                    | 21 20                   | 92.F                 | 76.F                 | -0.018                      | 4 7                     | 54.F                 | 53.F                 | -3.149                                  | 1796.                     | 7.278                           |
| SEP   | 5.58561                     | 5 19                    | 87.F                 | 76.F                 | -0.726                      | 13 7                    | 44.F                 | 44.F                 | -8.187                                  | 1904.                     | 7.278                           |
| OCT   | 3.76598                     | 10 19                   | 74.F                 | 67.F                 | -1.237                      | 20 8                    | 23.F                 | 22.F                 | -17.154                                 | 1937.                     | 7.278                           |
| NOV   | 1.22012                     | 6 24                    | 59.F                 | 55.F                 | -4.525                      | 3 6                     | 13.F                 | 12.F                 | -22.473                                 | 1763.                     | 7.278                           |
| DEC   | 0.56648                     | 3 23                    | 49.F                 | 42.F                 | -8.834                      | 13 8                    | 0.F                  | -1.F                 | -28.756                                 | 1984.                     | 7.278                           |
| TOTAL | 50.923                      |                         |                      |                      | -40.697                     |                         |                      |                      | -30.921                                 | 22402.                    | 7.278                           |
| TAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |

H20-31

EMC ENGINEERS INC. EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9:19:58 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AHU-2 TOPEKA, KS

| MONTH  | N U M B E R O F          |                          |                            |                   | H O U R S                  |                            |                     |                     | C O I N C I D E N T L O A D S        |  |  |  |
|--------|--------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|---------------------|---------------------|--------------------------------------|--|--|--|
|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS<br>ON | HOURS<br>FANS<br>ON | HOURS<br>FLOTTING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |
| JAN    | 84                       | 660                      | 0                          | 0                 | 744                        | 744                        | 744                 | 0                   | 0                                    | 0.000  | 7.278  |  |
| FEB    | 102                      | 570                      | 0                          | 0                 | 672                        | 672                        | 744                 | 0                   | 0                                    | 0.000  | 7.278  |  |
| MAR    | 137                      | 607                      | 0                          | 0                 | 744                        | 744                        | 744                 | 0                   | 0                                    | 0.000  | 7.278  |  |
| APR    | 440                      | 280                      | 0                          | 0                 | 720                        | 720                        | 720                 | 0                   | 0                                    | 0.000  | 7.278  |  |
| MAY    | 565                      | 179                      | 0                          | 0                 | 744                        | 744                        | 744                 | 0                   | 0                                    | 0.000  | 7.278  |  |
| JUN    | 675                      | 45                       | 0                          | 0                 | 720                        | 720                        | 720                 | 0                   | 0                                    | 0.000  | 7.278  |  |
| JUL    | 744                      | 0                        | 0                          | 0                 | 744                        | 744                        | 744                 | 0                   | 0                                    | 0.000  | 7.278  |  |
| AUG    | 731                      | 13                       | 0                          | 0                 | 744                        | 744                        | 744                 | 0                   | 0                                    | 0.000  | 7.278  |  |
| SEP    | 538                      | 182                      | 0                          | 0                 | 720                        | 720                        | 744                 | 0                   | 0                                    | 0.000  | 7.278  |  |
| OCT    | 461                      | 283                      | 0                          | 0                 | 744                        | 744                        | 744                 | 0                   | 0                                    | 0.000  | 7.278  |  |
| NOV    | 234                      | 486                      | 0                          | 0                 | 720                        | 720                        | 720                 | 0                   | 0                                    | 0.000  | 7.278  |  |
| DEC    | 98                       | 646                      | 0                          | 0                 | 744                        | 744                        | 744                 | 0                   | 0                                    | 0.000  | 7.278  |  |
| ANNUAL | 4809                     | 3951                     | 0                          | 0                 | 8760                       | 8760                       | 8760                | 0                   | 0                                    |  |  |  |



EMC ENGINEERS INC. 80227 EZZOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9:19:58 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #2 DDC CONTROL FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>47.250<br>138.256<br>6/17 | NATURAL-GAS<br>172.968<br>433.470<br>15/ 8 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 43.010<br>138.181<br>18/17               | 129.719<br>402.096<br>3/ 7                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 46.062<br>137.777<br>4/17                | 101.794<br>310.124<br>3/ 8                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 44.686<br>140.466<br>28/17               | 24.455<br>218.214<br>5/ 7                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 54.408<br>210.345<br>30/24               | 4.576<br>128.642<br>5/ 7                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 70.030<br>214.368<br>19/24               | 0.354<br>15.596<br>2/ 7                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 84.104<br>236.464<br>23/17               | 0.000<br>0.000<br>31/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 81.397<br>229.059<br>21/17               | 0.092<br>9.984<br>4/ 7                     |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 59.615<br>215.291<br>5/24                | 2.067<br>18.216<br>13/ 7                   |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 46.418<br>168.883<br>1/24                | 19.465<br>248.637<br>20/ 8                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 44.060<br>137.648<br>3/17                | 79.338<br>313.562<br>3/ 6                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 48.114<br>137.344<br>16/17               | 152.014<br>392.204<br>13/ 8                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |  |  |
|     | ONE YEAR<br>USE/PEAK                             | 669.153<br>236.464                       | 686.842<br>433.470                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9:19:58 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 25.02       | 686.84      |
| SPACE COOL                                       | 148.67      | 0.00        |
| HVAC AUX   | 391.08      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 62.50       | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 41.86       | 0.00        |
| TOTAL  | 669.12      | 686.84      |

TOTAL SITE ENERGY 1355.99 MBTU 160.5 KBTU/SQFT-YR GROSS-AREA 160.5 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2696.31 MBTU 319.1 KBTU/SQFT-YR GROSS-AREA 319.1 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 3.7  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



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$-----$
$ EZ - DOE  S Y S T E M S  I N P U T $
$-----$

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## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

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        LINE-4 *RUN #3 ECONOMIZER FOR BLDG. #7866      *

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        LINE-5 *THEATER W/DRESS RM      * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE  (1,24) (1.) ..

```

```

SD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..

```

```

SD_WT_HT   =DAY-SCHEDULE  (1,16) (55.)
                (17,24) (74.) ..

```

```

SD_SM_CL   =DAY-SCHEDULE  (1,16) (85.)
                (17,24) (72.) ..

```

```

SD_WT_CL   =DAY-SCHEDULE  (1,16) (55.2)
                (17,24) (74.2) ..

```

```

SD_SM_HT   =DAY-SCHEDULE  (1,16) (84.8)
                (17,24) (71.8) ..

```

```

SD_FAN_CYC =DAY-SCHEDULE  (1,6) (-1.)
                (7,16) (0.) ..
                (17,24) (1.) ..

```

```

SD_WT_HT_D =DAY-SCHEDULE  (1,24) (55.) ..

```

```

SD_WT_CL_D =DAY-SCHEDULE  (1,24) (55.2) ..

```

```

SD_SM_CL_D =DAY-SCHEDULE  (1,24) (85.) ..

```

```

SD_SM_HT_D =DAY-SCHEDULE  (1,24) (84.8) ..

```

```

SW_ON      =WEEK-SCHEDULE  (ALL) SD_ON ..

```

```

SW_OFF     =WEEK-SCHEDULE  (ALL) SD_OFF ..

```

```

SW_WT_HT   =WEEK-SCHEDULE  (MON) SD_WT_HT_D
                (TUE) SD_WT_HT_D
                (WED) SD_WT_HT_D
                (THU) SD_WT_HT
                (FRI) SD_WT_HT
                (SAT) SD_WT_HT
                (SUN) SD_WT_HT
                (HOL) SD_WT_HT ..

```

```

SW_SM_CL   =WEEK-SCHEDULE  (MON) SD_SM_CL_D
                (TUE) SD_SM_CL_D
                (WED) SD_SM_CL_D

```

(THU) SD\_SM\_CL  
 (FRI) SD\_SM\_CL  
 (SAT) SD\_SM\_CL  
 (SUN) SD\_SM\_CL  
 (HOL) SD\_SM\_CL ..

SW\_WT\_CL =WEEK-SCHEDULE (MON) SD\_WT\_CL\_D  
 (TUE) SD\_WT\_CL\_D  
 (WED) SD\_WT\_CL\_D  
 (THU) SD\_WT\_CL  
 (FRI) SD\_WT\_CL  
 (SAT) SD\_WT\_CL  
 (SUN) SD\_WT\_CL  
 (HOL) SD\_WT\_CL ..

SW\_SM\_HT =WEEK-SCHEDULE (MON) SD\_SM\_HT\_D  
 (TUE) SD\_SM\_HT\_D  
 (WED) SD\_SM\_HT\_D  
 (THU) SD\_SM\_HT  
 (FRI) SD\_SM\_HT  
 (SAT) SD\_SM\_HT  
 (SUN) SD\_SM\_HT  
 (HOL) SD\_SM\_HT ..

SW\_FAN\_CYC =WEEK-SCHEDULE (MON) SD\_OFF  
 (TUE) SD\_OFF  
 (WED) SD\_OFF  
 (THU) SD\_FAN\_CYC  
 (FRI) SD\_FAN\_CYC  
 (SAT) SD\_FAN\_CYC  
 (SUN) SD\_FAN\_CYC  
 (HOL) SD\_FAN\_CYC ..

## \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F = SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

S\_HRLY\_RPT = SCHEDULE THRU JAN 9 SW\_OFF  
 THRU JAN 10 SW\_ON  
 THRU JAN 22 SW\_OFF  
 THRU JAN 23 SW\_ON  
 THRU JUL 18 SW\_OFF  
 THRU JUL 19 SW\_ON  
 THRU JUL 22 SW\_OFF  
 THRU JUL 23 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_FAN\_CYCL = SCHEDULE THRU DEC 31 SW\_FAN\_CYC ..

# \$ ZONE DESCRIPTION

THEATER =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

LOBBY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

PROJ-ROOM =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

# \$ SYSTEM DESCRIPTION

AHU-1 =SYSTEM SYSTEM-TYPE = SZRH  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED HEAT-SET-T = 55.0  
 PREHEAT-T = 0.0 ECONO-LIMIT-T = 69.0 ←  
 SUPPLY-CFM = 14500. RATED-CFM = 14500.  
 MIN-OUTSIDE-AIR = 0.17 FAN-SCHEDULE = S\_FAN\_CYCL  
 SUPPLY-DELTA-T = 2.4 SUPPLY-KW = 0.00078  
 FAN-PLACEMENT = BLOW-THROUGH  
 NIGHT-CYCLE-CTRL = CYCLE-ON-ANY NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0 REHEAT-DELTA-T = 27.8  
 COOLING-CAPACITY = 453656. COOL-SH-CAP = 380832.  
 HEATING-CAPACITY = -417300.  
 SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (THEATER, LOBBY) ..

```

AHU-2      =SYSTEM      SYSTEM-TYPE = SZRH
                MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
                HEATING-SCHEDULE = S_ON  COOLING-SCHEDULE = S_ON
                HEAT-SET-T = 55.0  PREHEAT-T = 0.0
                ECONO-LIMIT-T = 69.0  SUPPLY-CFM = 1800.
                RATED-CFM = 1800.  MIN-OUTSIDE-AIR = 0.17
                FAN-SCHEDULE = S_FAN_CYCL  SUPPLY-DELTA-T = 2.4
                SUPPLY-KW = 0.00078  FAN-PLACEMENT = BLOW-THROUGH
                NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  NIGHT-VENT-DT = 0.0
                MIN-CFM-RATIO = 1.0  REHEAT-DELTA-T = 17.
                COOLING-CAPACITY = 48900.  COOL-SH-CAP = 48900.
                HEATING-CAPACITY = -30709.3
                ZONE-HEAT-SOURCE = ELECTRIC
                SIZING-OPTION = COINCIDENT  RETURN-AIR-PATH = DUCT
                ZONE-NAMES = (PROJ-ROOM) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

THEAT-BLK  =REPORT-BLOCK VARIABLE-TYPE = THEATER
                VARIABLE-LIST = (17,18,7,6) ..
LOBBY-BLK  =REPORT-BLOCK VARIABLE-TYPE = LOBBY
                VARIABLE-LIST = (17,18,7,6) ..
PROJ-BLK   =REPORT-BLOCK VARIABLE-TYPE = PROJ-ROOM
                VARIABLE-LIST = (17,18,7,6) ..
AHU-1-BLK  =REPORT-BLOCK VARIABLE-TYPE = AHU-1
                VARIABLE-LIST = (3,5,6,17,39) ..
AHU-2-BLK  =REPORT-BLOCK VARIABLE-TYPE = AHU-2
                VARIABLE-LIST = (3,5,6,17,39) ..
ZONES-HRLY = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY_RPT
                REPORT-BLOCK = (THEAT-BLK,LOBBY-BLK,PROJ-BLK)
..
AHU-HRLY   = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY_RPT
                REPORT-BLOCK = (AHU-1-BLK,AHU-2-BLK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

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## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *   EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *   DENVER,      CO      80227      *

        LINE-4 *RUN #3 ECONOMIZER FOR BLDG. #7866      *
        LINE-5 *THEATER W/DRESS RM                      * ..

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ABORT      ERRORS ..

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| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9:42: 2 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|---|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #7866 THEATER W/DRESS RM                         |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AHU-1 TOPEKA, KS                                |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----                                   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| MONTH   | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -69.561                     | 14                      | 20                   | -2. F                | -3. F                                   | 8137.                              | 29.492                          |
| FEB   | 0.00000                     |                         |                      |                      | -47.884                     | 3                       | 19                   | 19. F                | 16. F                                   | 7488.                              | 29.492                          |
| MAR   | 0.00000                     |                         |                      |                      | -33.029                     | 3                       | 19                   | 24. F                | 20. F                                   | 8268.                              | 29.492                          |
| APR   | 0.00000                     |                         |                      |                      | -6.979                      | 14                      | 17                   | 51. F                | 42. F                                   | 8510.                              | 29.492                          |
| MAY   | 13.19868                    | 22                      | 19                   | 77. F                | 70. F                       | 5                       | 17                   | 65. F                | 52. F                                   | 8883.                              | 29.492                          |
| JUN   | 38.60798                    | 30                      | 17                   | 88. F                | 73. F                       |                         |                      |                      | 0.000                                   | 8494.                              | 29.492                          |
| JUL   | 59.07546                    | 17                      | 19                   | 88. F                | 80. F                       |                         |                      |                      | 0.000                                   | 8870.                              | 29.492                          |
| AUG   | 50.45203                    | 11                      | 17                   | 98. F                | 71. F                       |                         |                      |                      | 0.000                                   | 8478.                              | 29.492                          |
| SEP   | 23.16676                    | 8                       | 17                   | 89. F                | 72. F                       |                         |                      |                      | 0.000                                   | 8572.                              | 29.492                          |
| OCT   | 0.36147                     | 1                       | 19                   | 81. F                | 66. F                       | 20                      | 18                   | 51. F                | 42. F                                   | 8752.                              | 29.492                          |
| NOV   | 0.00000                     |                         |                      |                      | -27.101                     | 3                       | 17                   | 46. F                | 36. F                                   | 7958.                              | 29.492                          |
| DEC   | 0.00000                     |                         |                      |                      | -63.400                     | 8                       | 19                   | 14. F                | 11. F                                   | 8429.                              | 29.492                          |
| TOTAL   | 184.863                     |                         |                      |                      | -254.330                    |                         |                      |                      |   | 100844.                            |                                 |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      | -400.239                                |                                    | 29.492                          |
|   |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9:42: 2 SDL RUN 1 |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
|---|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #7866 THEATER W/DRESS RM                         |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AHU-1 TOPEKA, KS                                   |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----   |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| MONTH   | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | --COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN   | 0                        | 449                      | 0  | 295               | 744                        | 0                          | 568                          | 424                       | 0                                    | -47.129  | 11.310   |
| FEB   | 0                        | 379                      | 0  | 293               | 672                        | 0                          | 519                          | 383                       | 0                                    | -51.384  | 11.310   |
| MAR   | 0                        | 346                      | 0  | 398               | 744                        | 0                          | 588                          | 452                       | 0                                    | -142.207   | 29.492   |
| APR   | 0                        | 116                      | 0  | 604               | 720                        | 0                          | 601                          | 457                       | 0                                    | 0.000  | 0.000  |
| MAY   | 68                       | 22                       | 0  | 654               | 360                        | 127                        | 634                          | 490                       | 0                                    | 0.000  | 23.505   |
| JUN   | 209                      | 0                        | 0  | 511               | 0                          | 330                        | 608                          | 472                       | 0                                    | 0.000  | 29.492   |
| JUL   | 266                      | 0                        | 0  | 478               | 0                          | 394                        | 616                          | 456                       | 0                                    | 0.000  | 23.505   |
| AUG   | 291                      | 0                        | 0  | 453               | 0                          | 420                        | 615                          | 487                       | 0                                    | 0.000  | 29.492   |
| SEP   | 126                      | 0                        | 0  | 594               | 0                          | 287                        | 598                          | 446                       | 0                                    | 0.000  | 29.492   |
| OCT   | 4                        | 91                       | 0  | 649               | 720                        | 13                         | 614                          | 462                       | 0                                    | 0.000  | 23.505   |
| NOV   | 0                        | 232                      | 0  | 488               | 720                        | 0                          | 569                          | 441                       | 0                                    | -106.852   | 11.310   |
| DEC   | 0                        | 443                      | 0  | 301               | 744                        | 0                          | 577                          | 417                       | 0                                    | -177.152   | 29.492   |
| ANNUAL  | 964                      | 2078                     | 0  | 5718              | 5424                       | 1571                       | 7107                         | 5387                      | 0                                    |  | 4065   |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9:42: 2 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AHU-2 TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                           |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00587                     | 18 15                   | 56.F                 | 46.F                 | 2.831                                   | -4.708                      | 14 23                   | -4.F                 | -5.F                 | -28.135                                 | 1451.                     | 7.278                           |
| FEB   | 0.06966                     | 26 15                   | 60.F                 | 45.F                 | 7.920                                   | -2.908                      | 3 9                     | 3.F                  | 1.F                  | -25.716                                 | 1325.                     | 7.278                           |
| MAR   | 0.42636                     | 12 11                   | 68.F                 | 48.F                 | 13.380                                  | -1.761                      | 3 19                    | 24.F                 | 20.F                 | -23.480                                 | 1439.                     | 7.278                           |
| APR   | 3.48912                     | 29 7                    | 62.F                 | 61.F                 | 29.521                                  | -0.160                      | 14 17                   | 51.F                 | 42.F                 | -12.061                                 | 1635.                     | 7.278                           |
| MAY   | 4.78570                     | 14 7                    | 66.F                 | 63.F                 | 41.775                                  | -0.781                      | 19 8                    | 58.F                 | 55.F                 | -14.414                                 | 1573.                     | 7.278                           |
| JUN   | 4.76349                     | 30 18                   | 86.F                 | 73.F                 | 44.615                                  | -0.755                      | 2 8                     | 55.F                 | 52.F                 | -16.028                                 | 1355.                     | 7.278                           |
| JUL   | 6.73750                     | 17 18                   | 88.F                 | 80.F                 | 50.458                                  | -0.372                      | 29 8                    | 64.F                 | 61.F                 | -10.746                                 | 1496.                     | 7.278                           |
| AUG   | 5.59883                     | 21 17                   | 95.F                 | 77.F                 | 46.942                                  | -0.362                      | 26 8                    | 66.F                 | 64.F                 | -10.482                                 | 1299.                     | 7.278                           |
| SEP   | 3.34041                     | 1 22                    | 68.F                 | 67.F                 | 46.283                                  | -1.681                      | 30 10                   | 47.F                 | 45.F                 | -21.564                                 | 1481.                     | 7.278                           |
| OCT   | 3.86041                     | 1 18                    | 83.F                 | 68.F                 | 29.184                                  | -0.264                      | 1 8                     | 47.F                 | 45.F                 | -19.644                                 | 1711.                     | 7.278                           |
| NOV   | 1.26098                     | 7 3                     | 60.F                 | 56.F                 | 14.829                                  | -1.401                      | 3 7                     | 19.F                 | 17.F                 | -19.582                                 | 1407.                     | 7.278                           |
| DEC   | 0.02959                     | 18 16                   | 55.F                 | 44.F                 | 4.957                                   | -3.912                      | 8 21                    | 13.F                 | 10.F                 | -25.768                                 | 1559.                     | 7.278                           |
| TOTAL | 34.368                      |                         |                      |                      |   | -19.065                     |                         |                      |                      |   | 17732.                    |                                 |
| MAX   |                             |                         |                      |                      | 50.458                                  |                             |                         |                      |                      | -28.135                                 |                           | 7.278                           |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9:42: 2 SDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AHU-2 TOPEKA, KS

| MONTH  | HOURS           |                 |                   |                    | N U M B E R       |                   |                   |                  | H O U R S                    |                           |                             |  | C O I N C I D E N T   |  |  |  | L O A D S |  |  |  |
|--------|-----------------|-----------------|-------------------|--------------------|-------------------|-------------------|-------------------|------------------|------------------------------|---------------------------|-----------------------------|--|---|--|--|--|-----------|--|--|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | COINCIDENT<br>LOAD | FLOATING<br>HOURS | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON<br>HOURS | FANS ON<br>CYCLE ON<br>HOURS | NIGHT<br>VENTING<br>HOURS | FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | COINCIDENT<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | COINCIDENT<br>ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |  |           |  |  |  |
| JAN    | 3               | 357             | 0                 | 0                  | 384               | 744               | 744               | 744              | 431                          | 287                       | 0                           | 71   | 0.000   | 1.404  |  |  |           |  |  |  |
| FEB    | 13              | 297             | 0                 | 0                  | 362               | 672               | 672               | 672              | 375                          | 239                       | 0                           | 65   | 0.000   | 1.404  |  |  |           |  |  |  |
| MAR    | 65              | 240             | 0                 | 0                  | 439               | 744               | 744               | 744              | 456                          | 320                       | 0                           | 151  | 0.000   | 1.404  |  |  |           |  |  |  |
| APR    | 335             | 46              | 0                 | 0                  | 339               | 720               | 720               | 720              | 562                          | 418                       | 0                           | 181  | 0.000   | 1.404  |  |  |           |  |  |  |
| MAY    | 304             | 130             | 0                 | 0                  | 310               | 744               | 744               | 744              | 518                          | 374                       | 0                           | 84   | 0.000   | 1.404  |  |  |           |  |  |  |
| JUN    | 207             | 173             | 0                 | 0                  | 340               | 720               | 720               | 720              | 396                          | 260                       | 0                           | 16   | 0.000   | 7.278  |  |  |           |  |  |  |
| JUL    | 263             | 132             | 0                 | 0                  | 349               | 744               | 744               | 744              | 396                          | 236                       | 0                           | 1  | 0.000   | 7.278  |  |  |           |  |  |  |
| AUG    | 272             | 112             | 0                 | 0                  | 360               | 744               | 744               | 744              | 390                          | 262                       | 0                           | 6  | 0.000   | 7.278  |  |  |           |  |  |  |
| SEP    | 144             | 209             | 0                 | 0                  | 367               | 720               | 720               | 720              | 419                          | 267                       | 0                           | 66   | 0.000   | 7.278  |  |  |           |  |  |  |
| OCT    | 347             | 44              | 0                 | 0                  | 353               | 744               | 744               | 744              | 583                          | 431                       | 0                           | 192  | 0.000   | 7.278  |  |  |           |  |  |  |
| NOV    | 140             | 185             | 0                 | 0                  | 395               | 720               | 720               | 720              | 467                          | 339                       | 0                           | 142  | 0.000   | 1.404  |  |  |           |  |  |  |
| DEC    | 10              | 332             | 0                 | 0                  | 402               | 744               | 744               | 744              | 441                          | 281                       | 0                           | 99   | 0.000   | 1.404  |  |  |           |  |  |  |
| ANNUAL | 2103            | 2257            | 0                 | 0                  | 4400              | 8760              | 8760              | 8760             | 5434                         | 3714                      | 0                           | 1074   |   |  |  |  |           |  |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9:42: 2 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>36.581<br>135.664<br>30/24 | NATURAL-GAS<br>106.994<br>537.348<br>14/20 |
|-----|--|---|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 33.277<br>135.664<br>27/24                | 75.887<br>500.254<br>3/19                  |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 36.214<br>135.664<br>31/24                | 54.370<br>454.355<br>3/19                  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 38.643<br>139.742<br>24/17                | 11.884<br>365.786<br>14/17                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 44.251<br>231.930<br>30/24                | 3.747<br>281.766<br>5/17                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 49.992<br>270.808<br>30/17                | 2.272<br>32.188<br>2/ 8                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 58.730<br>289.321<br>23/17                | 1.399<br>23.556<br>29/ 8                   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 55.695<br>290.235<br>11/17                | 1.264<br>23.126<br>26/ 8                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 44.706<br>268.508<br>8/17                 | 4.000<br>41.234<br>30/10                   |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 39.988<br>179.153<br>1/19                 | 9.278<br>385.773<br>20/18                  |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 35.280<br>135.664<br>27/17                | 44.116<br>411.013<br>3/17                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 38.068<br>135.664<br>31/24                | 99.511<br>486.897<br>8/19                  |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |   |  |
|     | ONE YEAR<br>USE/PEAK                             | 511.425<br>290.235                        | 414.721<br>537.348                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 9:42: 2 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 15.69       | 414.72      |
| SPACE COOL      | 83.66       | 0.00        |
| HVAC AUX        | 307.71      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 62.50       | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 41.85       | 0.00        |
| TOTAL           | 511.40      | 414.72      |

TOTAL SITE ENERGY 926.15 MBTU 109.6 KBTU/SQFT-YR GROSS-AREA 109.6 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 1950.53 MBTU 230.8 KBTU/SQFT-YR GROSS-AREA 230.9 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 34.1  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #4 NIGHT INFILTRATION OR BLDG. #7866\*

LINE-5 \*THEATER W/DRESS RM \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)  
 SUMMARY=(SS-A,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,24) (74.2) ..  
 SD\_SM\_HT =DAY-SCHEDULE (1,24) (71.8) ..  
 SD\_OA% =DAY-SCHEDULE (1,16) (0.) ..  
 (17,24) (0.17) ..



SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..  
 SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..  
 SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..  
 SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..  
 SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..  
 SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..  
 SW\_OA% =WEEK-SCHEDULE (MON) SD\_OFF  
 (TUE) SD\_OFF  
 (WED) SD\_OFF  
 (THU) SD\_OA%  
 (FRI) SD\_OA%  
 (SAT) SD\_OA%  
 (SUN) SD\_OA%  
 (HOL) SD\_OA% ..

## \$ FULL ON SYSTEM

S\_ON =SCHEDULE THRU DEC 31 SW\_ON ..

## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

S\_HRLY\_RPT =SCHEDULE THRU JAN 9 SW\_OFF  
 THRU JAN 10 SW\_ON  
 THRU JAN 22 SW\_OFF  
 THRU JAN 23 SW\_ON  
 THRU JUL 18 SW\_OFF  
 THRU JUL 19 SW\_ON  
 THRU JUL 22 SW\_OFF  
 THRU JUL 23 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

## \$ ZONE DESCRIPTION

THEATER =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

LOBBY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

PROJ-ROOM =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

AHU-1      =SYSTEM      SYSTEM-TYPE = SZRH  
                  MAX-SUPPLY-T = 120.0    MIN-SUPPLY-T = 55.0  
                  HEATING-SCHEDULE = S\_HE-SCHED  
                  COOLING-SCHEDULE = S\_CL\_SCHED    HEAT-SET-T = 55.0  
                  PREHEAT-T = 0.0    OA-CONTROL = FIXED  
                  SUPPLY-CFM = 14500.    RATED-CFM = 14500.  
                  MIN-AIR-SCH = S\_OA%    MAX-OA-FRACTION = 0.17  
                  SUPPLY-DELTA-T = 2.4    SUPPLY-KW = 0.00078  
                  FAN-PLACEMENT = BLOW-THROUGH  
                  NIGHT-CYCLE-CTRL = STAY-OFF    NIGHT-VENT-DT = 0.0  
                  MIN-CFM-RATIO = 1.0    REHEAT-DELTA-T = 27.8  
                  COOLING-CAPACITY = 453656.    COOL-SH-CAP = 380832.  
                  HEATING-CAPACITY = -417300.  
                  SIZING-OPTION = COINCIDENT    RETURN-AIR-PATH = DUCT  
                  ZONE-NAMES = (THEATER, LOBBY) ..

AHU-2      =SYSTEM      SYSTEM-TYPE = SZRH  
                  MAX-SUPPLY-T = 120.0    MIN-SUPPLY-T = 55.0  
                  HEATING-SCHEDULE = S\_ON    COOLING-SCHEDULE = S\_ON  
                  HEAT-SET-T = 55.0    PREHEAT-T = 0.0  
                  OA-CONTROL = FIXED    SUPPLY-CFM = 1800.  
                  RATED-CFM = 1800.    MIN-AIR-SCH = S\_OA%  
                  MAX-OA-FRACTION = 0.17    SUPPLY-DELTA-T = 2.4  
                  SUPPLY-KW = 0.00078    FAN-PLACEMENT = BLOW-THROUGH  
                  NIGHT-CYCLE-CTRL = STAY-OFF    NIGHT-VENT-DT = 0.0  
                  MIN-CFM-RATIO = 1.0    REHEAT-DELTA-T = 17.  
                  COOLING-CAPACITY = 48900.    COOL-SH-CAP = 48900.  
                  HEATING-CAPACITY = -30709.3  
                  ZONE-HEAT-SOURCE = ELECTRIC  
                  SIZING-OPTION = COINCIDENT    RETURN-AIR-PATH = DUCT  
                  ZONE-NAMES = (PROJ-ROOM) ..

## \$ HOURLY REPORT DESCRIPTION

THEAT-BLK    =REPORT-BLOCK    VARIABLE-TYPE = THEATER  
                                  VARIABLE-LIST = (17,18,7,6) ..  
 LOBBY-BLK    =REPORT-BLOCK    VARIABLE-TYPE = LOBBY  
                                  VARIABLE-LIST = (17,18,7,6) ..  
 PROJ-BLK    =REPORT-BLOCK    VARIABLE-TYPE = PROJ-ROOM  
                                  VARIABLE-LIST = (17,18,7,6) ..  
 AHU-1-BLK    =REPORT-BLOCK    VARIABLE-TYPE = AHU-1  
                                  VARIABLE-LIST = (3,5,6,17,39) ..  
 AHU-2-BLK    =REPORT-BLOCK    VARIABLE-TYPE = AHU-2  
                                  VARIABLE-LIST = (3,5,6,17,39) ..  
 ZONES-HRLY    = HOURLY-REPORT    REPORT-SCHEDULE = S\_HRLY\_RPT  
                                  REPORT-BLOCK = (THEAT-BLK, LOBBY-BLK, PROJ-BLK)  
 ..  
 AHU-HRLY    = HOURLY-REPORT    REPORT-SCHEDULE = S\_HRLY\_RPT  
                                  REPORT-BLOCK = (AHU-1-BLK, AHU-2-BLK)  
 ..  
 END ..

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10: 0:13 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION OR BLDG. #7866THEATER W/DRESS RM  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AHU-1 TOPEKA, KS

| MONTH        | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |   |
|--------------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---|
|              | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | MAXIMUM<br>ELEC-<br>TRICAL<br>ENERGY<br>(KWH) |
| JAN          | 0.00000                     |                         |                      |                      | -82.340                     | 14 17                   | 0. F                 | -2. F                | -333.010                                | 10128.  |
| FEB          | 0.00000                     |                         |                      |                      | -59.052                     | 3 17                    | 24. F                | 21. F                | -221.883                                | 9218.   |
| MAR          | 0.00000                     |                         |                      |                      | -41.592                     | 3 22                    | 20. F                | 17. F                | -180.491                                | 10032.  |
| APR          | 0.00000                     |                         |                      |                      | -7.715                      | 5 8                     | 34. F                | 30. F                | -78.961                                 | 9856.   |
| MAY          | 29.63481                    | 16 2                    | 62. F                | 59. F                | -0.549                      | 5 8                     | 46. F                | 41. F                | -26.960                                 | 10128.  |
| JUN          | 66.87326                    | 19 19                   | 86. F                | 75. F                | 0.000                       |                         |                      |                      | 0.000                                   | 9761.   |
| JUL          | 88.13656                    | 17 19                   | 88. F                | 80. F                | 0.000                       |                         |                      |                      | 0.000                                   | 10318.  |
| AUG          | 81.26391                    | 21 19                   | 95. F                | 76. F                | 0.000                       |                         |                      |                      | 0.000                                   | 9937.   |
| SEP          | 45.40338                    | 5 19                    | 87. F                | 76. F                | 0.000                       |                         |                      |                      | 0.000                                   | 9951.   |
| OCT          | 0.98839                     | 1 19                    | 81. F                | 66. F                | -5.214                      | 20 9                    | 29. F                | 29. F                | -88.741                                 | 10223.  |
| NOV          | 0.00000                     |                         |                      |                      | -32.729                     | 3 7                     | 19. F                | 17. F                | -125.058                                | 9666.   |
| DEC          | 0.00000                     |                         |                      |                      | -71.032                     | 9 17                    | 20. F                | 16. F                | -240.587                                | 10318.  |
| TOTAL<br>MAX | 312.300                     |                         |                      |                      | -300.222                    |                         |                      |                      | -333.010                                | 119543.                                       |
|              |                             |                         |                      |                      |                             |                         |                      |                      |   | 29.492  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10: 0:13 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION OR BLDG. #7866THEATER W/DRESS RM  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AHU-1 TOPEKA, KS

| MONTH  | N U M B E R O F          |                          |                            |                   | H O U R S                  |                            |                              |                           | C O I N C I D E N T L O A D S        |  |  |                                 |
|--------|--------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|---------------------------------|
|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>COOLING<br>AVAIL. | HOURS<br>HEATING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN    | 0                        | 744                      | 0                          | 0                 | 744                        | 0                          | 0                            | 0                         | 0                                    | -72.280  | 11.310   | 29.492                          |
| FEB    | 0                        | 672                      | 0                          | 0                 | 672                        | 0                          | 0                            | 0                         | 0                                    | -74.548  | 11.310   | 29.492                          |
| MAR    | 0                        | 710                      | 0                          | 34                | 744                        | 0                          | 0                            | 0                         | 34                                   | -76.707  | 11.310   | 29.492                          |
| APR    | 0                        | 488                      | 0                          | 232               | 720                        | 0                          | 0                            | 0                         | 232                                  | 0.000  | 11.310   | 29.492                          |
| MAY    | 378                      | 198                      | 0                          | 168               | 360                        | 378                        | 0                            | 0                         | 168                                  | 0.000  | 11.310   | 29.492                          |
| JUN    | 717                      | 0                        | 0                          | 3                 | 0                          | 717                        | 0                            | 0                         | 3                                    | 0.000  | 23.505   | 29.492                          |
| JUL    | 744                      | 0                        | 0                          | 0                 | 0                          | 744                        | 0                            | 0                         | 0                                    | 0.000  | 23.505   | 29.492                          |
| AUG    | 744                      | 0                        | 0                          | 0                 | 0                          | 744                        | 0                            | 0                         | 0                                    | 0.000  | 23.505   | 29.492                          |
| SEP    | 643                      | 0                        | 0                          | 77                | 0                          | 643                        | 0                            | 0                         | 77                                   | 0.000  | 23.505   | 29.492                          |
| OCT    | 8                        | 479                      | 0                          | 257               | 8                          | 744                        | 0                            | 0                         | 257                                  | 0.000  | 11.310   | 29.492                          |
| NOV    | 0                        | 642                      | 0                          | 78                | 720                        | 0                          | 0                            | 0                         | 78                                   | -93.619  | 11.310   | 29.492                          |
| DEC    | 0                        | 744                      | 0                          | 0                 | 744                        | 0                          | 0                            | 0                         | 0                                    | -127.187   | 11.310   | 29.492                          |
| ANNUAL | 3234                     | 4677                     | 0                          | 849               | 5424                       | 3234                       | 0                            | 0                         | 849                                  |  |  |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10: 0:13 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION OR BLDG. #7866THEATER W/DRESS RM  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AHU-2 TOPEKA, KS

| MONTH        | C O O L I N G               |                         |                      |                      | H E A T I N G                           |                             |                         |                      | E L E C              |   |                           |                                 |
|--------------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|              | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN          | 0.01514                     | 22 24                   | 40.F                 | 38.F                 | 2.353                                   | -5.409                      | 14 17                   | 0.F                  | -2.F                 | -25.736                                 | 1890.                     | 7.278                           |
| FEB          | 0.09288                     | 26 18                   | 52.F                 | 41.F                 | 5.939                                   | -3.530                      | 3 9                     | 3.F                  | 1.F                  | -13.960                                 | 1742.                     | 7.278                           |
| MAR          | 0.73383                     | 24 18                   | 65.F                 | 64.F                 | 13.383                                  | -2.425                      | 3 24                    | 17.F                 | 14.F                 | -10.489                                 | 1843.                     | 7.278                           |
| APR          | 2.77139                     | 28 19                   | 71.F                 | 68.F                 | 24.846                                  | -0.373                      | 5 8                     | 34.F                 | 30.F                 | -5.940                                  | 1857.                     | 7.278                           |
| MAY          | 5.82925                     | 30 23                   | 78.F                 | 74.F                 | 37.663                                  | -0.023                      | 5 8                     | 46.F                 | 41.F                 | -2.356                                  | 1890.                     | 7.278                           |
| JUN          | 8.11590                     | 19 20                   | 84.F                 | 75.F                 | 39.400                                  | 0.000                       |                         |                      |                      | 0.000                                   | 1810.                     | 7.278                           |
| JUL          | 10.31944                    | 17 19                   | 88.F                 | 80.F                 | 47.165                                  | 0.000                       |                         |                      |                      | 0.000                                   | 1984.                     | 7.278                           |
| AUG          | 9.32853                     | 21 20                   | 92.F                 | 76.F                 | 42.534                                  | 0.000                       |                         |                      |                      | 0.000                                   | 1796.                     | 7.278                           |
| SEP          | 6.26517                     | 5 18                    | 90.F                 | 77.F                 | 39.235                                  | -0.003                      | 29 9                    | 50.F                 | 45.F                 | -0.470                                  | 1904.                     | 7.278                           |
| OCT          | 3.31353                     | 1 18                    | 83.F                 | 68.F                 | 25.433                                  | -0.266                      | 20 9                    | 29.F                 | 29.F                 | -7.191                                  | 1937.                     | 7.278                           |
| NOV          | 0.72217                     | 6 24                    | 59.F                 | 55.F                 | 13.283                                  | -1.723                      | 3 7                     | 19.F                 | 17.F                 | -10.292                                 | 1763.                     | 7.278                           |
| DEC          | 0.14442                     | 3 23                    | 49.F                 | 42.F                 | 6.546                                   | -4.369                      | 8 18                    | 14.F                 | 11.F                 | -15.197                                 | 1984.                     | 7.278                           |
| TOTAL<br>MAX | 47.652                      |                         |                      |                      | 47.165                                  | -18.122                     |                         |                      |                      | -25.736                                 | 22402.                    | 7.278                           |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10: 0:13 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION OR BLDG. #7866THEATER W/DRESS RM  
 REPORT- SS-C SYSTEM MONTHLY LOADS SUMMARY FOR AHU-2 TOPEKA, KS

| MONTH  | H O U R S                |                          |                            |                   | H O U R S                  |                            |                  |                           | H O U R S                            |  |  |  | C O I N C I D E N T L O A D S                      |  |  |  |
|--------|--------------------------|--------------------------|----------------------------|-------------------|----------------------------|----------------------------|------------------|---------------------------|--------------------------------------|--|--|--|--|--|--|--|
|        | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOTTING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | COOLING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | COOLING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | COOLING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | COOLING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) |
| JAN    | 17                       | 727                      | 0                          | 0                 | 744                        | 744                        | 744              | 0                         | 0                                    | 0.000  | 0.000  | 7.278  | 0.000  | 0.000  | 0.000  | 7.278  |
| FEB    | 38                       | 634                      | 0                          | 0                 | 672                        | 672                        | 672              | 0                         | 0                                    | 0.000  | 0.000  | 7.278  | 0.000  | 0.000  | 0.000  | 7.278  |
| MAR    | 176                      | 568                      | 0                          | 0                 | 744                        | 744                        | 744              | 0                         | 0                                    | 0.000  | 0.000  | 7.278  | 0.000  | 0.000  | 0.000  | 7.278  |
| APR    | 552                      | 168                      | 0                          | 0                 | 720                        | 720                        | 720              | 0                         | 0                                    | 0.000  | 0.000  | 7.278  | 0.000  | 0.000  | 0.000  | 7.278  |
| MAY    | 723                      | 21                       | 0                          | 0                 | 744                        | 744                        | 744              | 0                         | 0                                    | 0.000  | 0.000  | 7.278  | 0.000  | 0.000  | 0.000  | 7.278  |
| JUN    | 720                      | 0                        | 0                          | 0                 | 720                        | 720                        | 720              | 0                         | 0                                    | 0.000  | 0.000  | 7.278  | 0.000  | 0.000  | 0.000  | 7.278  |
| JUL    | 744                      | 0                        | 0                          | 0                 | 744                        | 744                        | 744              | 0                         | 0                                    | 0.000  | 0.000  | 7.278  | 0.000  | 0.000  | 0.000  | 7.278  |
| AUG    | 744                      | 0                        | 0                          | 0                 | 744                        | 744                        | 744              | 0                         | 0                                    | 0.000  | 0.000  | 7.278  | 0.000  | 0.000  | 0.000  | 7.278  |
| SEP    | 706                      | 14                       | 0                          | 0                 | 720                        | 720                        | 720              | 0                         | 0                                    | 0.000  | 0.000  | 7.278  | 0.000  | 0.000  | 0.000  | 7.278  |
| OCT    | 600                      | 144                      | 0                          | 0                 | 744                        | 744                        | 744              | 0                         | 0                                    | 0.000  | 0.000  | 7.278  | 0.000  | 0.000  | 0.000  | 7.278  |
| NOV    | 251                      | 469                      | 0                          | 0                 | 720                        | 720                        | 720              | 0                         | 0                                    | 0.000  | 0.000  | 7.278  | 0.000  | 0.000  | 0.000  | 7.278  |
| DEC    | 72                       | 672                      | 0                          | 0                 | 744                        | 744                        | 744              | 0                         | 0                                    | 0.000  | 0.000  | 7.278  | 0.000  | 0.000  | 0.000  | 7.278  |
| ANNUAL | 5343                     | 3417                     | 0                          | 0                 | 8760                       | 8760                       | 8760             | 0                         | 0                                    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |



EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10: 0:13 PDL RUN 1  
DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #4 NIGHT INFILTRATION OR BLDG. #7866THEATER W/DRESS RM  
REPORT- PS-B TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>47.031<br>139.273<br>9/17 | NATURAL-GAS<br>134.263<br>452.293<br>14/17 |
|-----|--|--|--|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 42.812<br>139.228<br>20/17               | 101.019<br>318.749<br>3/17                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 45.762<br>138.675<br>24/17               | 73.317<br>268.117<br>3/22                  |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 45.061<br>140.539<br>28/17               | 15.696<br>143.786<br>5/ 8                  |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 59.251<br>229.308<br>30/24               | 1.935<br>52.954<br>5/ 8                    |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 73.841<br>234.722<br>19/17               | 0.000<br>0.000<br>30/ 1                    |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 85.000<br>263.897<br>23/17               | 0.000<br>0.000<br>31/ 1                    |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 82.440<br>254.129<br>21/17               | 0.000<br>0.000<br>31/ 1                    |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 65.455<br>237.329<br>5/17                | 0.076<br>5.815<br>29/ 9                    |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 47.228<br>185.917<br>1/24                | 11.411<br>158.045<br>20/ 9                 |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 43.967<br>139.318<br>5/17                | 58.696<br>204.593<br>3/ 7                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 48.017<br>139.360<br>2/17                | 118.387<br>341.199<br>9/17                 |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |  |  |
|     | ONE YEAR<br>USE/PEAK                             | 685.868<br>263.897                       | 514.799<br>452.293                         |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10: 0:13 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION OR BLDG. #7866THEATER W/DRESS RM  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 23.71       | 514.80      |
| SPACE COOL      | 163.72      | 0.00        |
| HVAC AUX        | 394.07      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 62.50       | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 41.86       | 0.00        |
| TOTAL           | 685.85      | 514.80      |

TOTAL SITE ENERGY 1200.67 MBTU 142.1 KBTU/SQFT-YR GROSS-AREA 142.1 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2574.46 MBTU 304.7 KBTU/SQFT-YR GROSS-AREA 304.7 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.7  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



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$-----$
$ E Z - D O E   S Y S T E M S   I N P U T $
$-----$

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## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

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        LINE-4 *RUN #5 DAY INFILTRATION OR BLDG. #7866 *

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        LINE-5 *THEATER W/DRESS RM      * ..

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```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
SYSTEMS-REPORT  VERIFICATION=(SV-A)
                SUMMARY=(SS-A,SS-C,SS-K,SS-O)
                HOURLY-DATA-SAVE = YES ..

```

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE  (1,24) (1.) ..
SD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..
SD_WT_HT   =DAY-SCHEDULE  (1,24) (74.) ..
SD_SM_CL   =DAY-SCHEDULE  (1,24) (72.) ..
SD_WT_CL   =DAY-SCHEDULE  (1,24) (74.2) ..
SD_SM_HT   =DAY-SCHEDULE  (1,24) (71.8) ..
SD_OA%     =DAY-SCHEDULE  (1,16) (0.17) ..
                (17,24) (0.) ..
SD_OA%_END =DAY-SCHEDULE  (1,24) (0.17) ..

```



```

SW_ON      =WEEK-SCHEDULE  (ALL) SD_ON ..
SW_OFF     =WEEK-SCHEDULE  (ALL) SD_OFF ..
SW_WT_HT   =WEEK-SCHEDULE  (ALL) SD_WT_HT ..
SW_SM_CL   =WEEK-SCHEDULE  (ALL) SD_SM_CL ..
SW_WT_CL   =WEEK-SCHEDULE  (ALL) SD_WT_CL ..
SW_SM_HT   =WEEK-SCHEDULE  (ALL) SD_SM_HT ..
SW_OA%     =WEEK-SCHEDULE  (MON) SD_OA%_END
                (TUE) SD_OA%_END
                (WED) SD_OA%_END
                (THU) SD_OA%
                (FRI) SD_OA%
                (SAT) SD_OA%
                (SUN) SD_OA%
                (HOL) SD_OA% ..

```

## \$ FULL ON SYSTEM

```

S_ON      =SCHEDULE THRU DEC 31 SW_ON ..

```

## \$ FULL OFF SYSTEM

S\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..

## \$ HEATING SEASON

S\_HE-SCHED =SCHEDULE THRU MAY 15 SW\_ON  
 THRU OCT 1 SW\_OFF  
 THRU DEC 31 SW\_ON ..

## \$ COOLING SEASON

S\_CL\_SCHED =SCHEDULE THRU MAY 15 SW\_OFF  
 THRU OCT 1 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
 THRU OCT 1 SW\_SM\_HT  
 THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
 THRU OCT 1 SW\_SM\_CL  
 THRU DEC 31 SW\_WT\_CL ..

S\_HRLY\_RPT =SCHEDULE THRU JAN 9 SW\_OFF  
 THRU JAN 10 SW\_ON  
 THRU JAN 22 SW\_OFF  
 THRU JAN 23 SW\_ON  
 THRU JUL 18 SW\_OFF  
 THRU JUL 19 SW\_ON  
 THRU JUL 22 SW\_OFF  
 THRU JUL 23 SW\_ON  
 THRU DEC 31 SW\_OFF ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

## \$ ZONE DESCRIPTION

THEATER =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

LOBBY =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

PROJ-ROOM =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2

SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

AHU-1      =SYSTEM      SYSTEM-TYPE = SZRH  
 MAX-SUPPLY-T = 120.0    MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE-SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED    HEAT-SET-T = 55.0  
 PREHEAT-T = 0.0    OA-CONTROL = FIXED  
 SUPPLY-CFM = 14500.    RATED-CFM = 14500.  
MIN-AIR-SCH = S\_OA%    MAX-OA-FRACTION = 0.17    ←  
 SUPPLY-DELTA-T = 2.4    SUPPLY-KW = 0.00078  
 FAN-PLACEMENT = BLOW-THROUGH  
 NIGHT-CYCLE-CTRL = STAY-OFF    NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0    REHEAT-DELTA-T = 27.8  
 COOLING-CAPACITY = 453656.    COOL-SH-CAP = 380832.  
 HEATING-CAPACITY = -417300.  
 SIZING-OPTION = COINCIDENT    RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (THEATER, LOBBY) ..

AHU-2      =SYSTEM      SYSTEM-TYPE = SZRH  
 MAX-SUPPLY-T = 120.0    MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_ON    COOLING-SCHEDULE = S\_ON  
 HEAT-SET-T = 55.0    PREHEAT-T = 0.0  
 OA-CONTROL = FIXED    SUPPLY-CFM = 1800.  
 RATED-CFM = 1800.    MIN-AIR-SCH = S\_OA%    ←  
 MAX-OA-FRACTION = 0.17    SUPPLY-DELTA-T = 2.4  
 SUPPLY-KW = 0.00078    FAN-PLACEMENT = BLOW-THROUGH  
 NIGHT-CYCLE-CTRL = STAY-OFF    NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0    REHEAT-DELTA-T = 17.  
 COOLING-CAPACITY = 48900.    COOL-SH-CAP = 48900.  
 HEATING-CAPACITY = -30709.3  
 ZONE-HEAT-SOURCE = ELECTRIC  
 SIZING-OPTION = COINCIDENT    RETURN-AIR-PATH = DUCT  
 ZONE-NAMES = (PROJ-ROOM) ..

## \$ HOURLY REPORT DESCRIPTION

THEAT-BLK    =REPORT-BLOCK    VARIABLE-TYPE = THEATER  
                                  VARIABLE-LIST = (17,18,7,6) ..  
 LOBBY-BLK    =REPORT-BLOCK    VARIABLE-TYPE = LOBBY  
                                  VARIABLE-LIST = (17,18,7,6) ..  
 PROJ-BLK    =REPORT-BLOCK    VARIABLE-TYPE = PROJ-ROOM  
                                  VARIABLE-LIST = (17,18,7,6) ..  
 AHU-1-BLK    =REPORT-BLOCK    VARIABLE-TYPE = AHU-1  
                                  VARIABLE-LIST = (3,5,6,17,39) ..  
 AHU-2-BLK    =REPORT-BLOCK    VARIABLE-TYPE = AHU-2  
                                  VARIABLE-LIST = (3,5,6,17,39) ..  
 ZONES-HRLY    = HOURLY-REPORT    REPORT-SCHEDULE = S\_HRLY\_RPT  
                                  REPORT-BLOCK = (THEAT-BLK, LOBBY-BLK, PROJ-BLK)  
 ..  
 AHU-HRLY    = HOURLY-REPORT    REPORT-SCHEDULE = S\_HRLY\_RPT  
                                  REPORT-BLOCK = (AHU-1-BLK, AHU-2-BLK)  
 ..



EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10: 5:39 SDL RUN 1  
 DENVER, CO RUN #5 DAY INFILTRATION OR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR AHU-2 TOPEKA, KS

| MONTH | COOLING                     |                         |                      |                      | HEATING                     |                         |                      |                      | ELECTRIC                                |                           |                                 |  |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|--|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |  |
| JAN   | 1.07572                     | 22                      | 24                   | 40. F                | 38. F                       | 13.524                  | 15                   | 1                    | -13.479                                 | 1890.                     | 7.278                           |  |
| FEB   | 1.39176                     | 26                      | 24                   | 43. F                | 37. F                       | 15.259                  | 2                    | 23                   | -10.567                                 | 1742.                     | 7.278                           |  |
| MAR   | 1.78635                     | 27                      | 24                   | 46. F                | 41. F                       | 17.246                  | 3                    | 7                    | -9.038                                  | 1843.                     | 7.278                           |  |
| APR   | 2.87264                     | 28                      | 24                   | 65. F                | 64. F                       | 21.415                  | 5                    | 7                    | -2.947                                  | 1857.                     | 7.278                           |  |
| MAY   | 5.45895                     | 30                      | 24                   | 80. F                | 72. F                       | 25.052                  | 5                    | 7                    | -0.846                                  | 1890.                     | 7.278                           |  |
| JUN   | 9.57069                     | 30                      | 22                   | 77. F                | 73. F                       | 26.467                  | 2                    | 7                    | -0.066                                  | 1810.                     | 7.278                           |  |
| JUL   | 12.90110                    | 23                      | 16                   | 98. F                | 79. F                       | 29.903                  |                      |                      | 0.000                                   | 1984.                     | 7.278                           |  |
| AUG   | 12.29024                    | 11                      | 24                   | 85. F                | 68. F                       | 28.168                  | 4                    | 7                    | -0.013                                  | 1796.                     | 7.278                           |  |
| SEP   | 7.00205                     | 8                       | 24                   | 78. F                | 69. F                       | 25.922                  | 11                   | 7                    | -0.720                                  | 1904.                     | 7.278                           |  |
| OCT   | 3.20798                     | 1                       | 24                   | 64. F                | 60. F                       | 22.132                  | 20                   | 8                    | -2.784                                  | 1937.                     | 7.278                           |  |
| NOV   | 1.72658                     | 6                       | 24                   | 59. F                | 55. F                       | 18.263                  | 3                    | 6                    | -7.293                                  | 1763.                     | 7.278                           |  |
| DEC   | 1.58083                     | 3                       | 24                   | 46. F                | 42. F                       | 15.096                  | 13                   | 6                    | -12.246                                 | 1984.                     | 7.278                           |  |
| TOTAL | 60.865                      |                         |                      |                      |                             | 29.903                  |                      |                      | -59.999                                 | 22402.                    | 7.278                           |  |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      | -34.682                                 |                           |                                 |  |

EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10: 5:39 SDL RUN 1  
 DENVER, CO RUN #5 DAY INFILTRATION OR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR AHU-2 TOPEKA, KS

| MONTH  | HOURS           |                 |                   | N U M B E R   O F |                            |                            | H O U R S |                           |                           | HOURS                       |  |  | --COINCIDENT LOADS-- |  |  |
|--------|-----------------|-----------------|-------------------|-------------------|----------------------------|----------------------------|-----------|---------------------------|---------------------------|-----------------------------|--|--|----------------------|--|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING          | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | FANS ON   | HOURS<br>FANS<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |                      |  |  |
| JAN    | 123             | 621             | 0                 | 0                 | 744                        | 744                        | 744       | 0                         | 0                         | 0                           | 0.000  | 7.278  |                      |  |  |
| FEB    | 135             | 537             | 0                 | 0                 | 672                        | 672                        | 672       | 0                         | 0                         | 0                           | 0.000  | 7.278  |                      |  |  |
| MAR    | 136             | 608             | 0                 | 0                 | 744                        | 744                        | 744       | 0                         | 0                         | 0                           | 0.000  | 7.278  |                      |  |  |
| APR    | 279             | 441             | 0                 | 0                 | 720                        | 720                        | 720       | 0                         | 0                         | 0                           | 0.000  | 7.278  |                      |  |  |
| MAY    | 529             | 215             | 0                 | 0                 | 744                        | 744                        | 744       | 0                         | 0                         | 0                           | 0.000  | 7.278  |                      |  |  |
| JUN    | 689             | 31              | 0                 | 0                 | 720                        | 720                        | 720       | 0                         | 0                         | 0                           | 0.000  | 7.278  |                      |  |  |
| JUL    | 744             | 0               | 0                 | 0                 | 744                        | 744                        | 744       | 0                         | 0                         | 0                           | 0.000  | 1.404  |                      |  |  |
| AUG    | 735             | 9               | 0                 | 0                 | 744                        | 744                        | 744       | 0                         | 0                         | 0                           | 0.000  | 7.278  |                      |  |  |
| SEP    | 555             | 165             | 0                 | 0                 | 720                        | 720                        | 720       | 0                         | 0                         | 0                           | 0.000  | 7.278  |                      |  |  |
| OCT    | 301             | 443             | 0                 | 0                 | 744                        | 744                        | 744       | 0                         | 0                         | 0                           | 0.000  | 7.278  |                      |  |  |
| NOV    | 154             | 566             | 0                 | 0                 | 720                        | 720                        | 720       | 0                         | 0                         | 0                           | 0.000  | 7.278  |                      |  |  |
| DEC    | 160             | 584             | 0                 | 0                 | 744                        | 744                        | 744       | 0                         | 0                         | 0                           | 0.000  | 7.278  |                      |  |  |
| ANNUAL | 4540            | 4220            | 0                 | 0                 | 8760                       | 8760                       | 8760      | 0                         | 0                         | 0                           |  |  |                      |  |  |



EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/19/1995 10: 5:39 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION OR BLDG. #7866 THEATER W/DRESS RM  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO                   | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>48.711<br>138.393<br>16/17 | NATURAL-GAS<br>217.718<br>559.457<br>15/ 7 |
|----------------------|--|---|--|
| JAN                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 48.711<br>138.393<br>16/17                | 217.718<br>559.457<br>15/ 7                |
| FEB                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 44.298<br>137.685<br>5/17                 | 168.248<br>526.478<br>3/ 7                 |
| MAR                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 47.739<br>137.348<br>3/17                 | 145.856<br>421.266<br>3/ 8                 |
| APR                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 44.880<br>138.180<br>28/24                | 47.851<br>310.813<br>5/ 7                  |
| MAY                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 56.203<br>197.894<br>30/24                | 12.055<br>209.971<br>5/ 7                  |
| JUN                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 73.579<br>200.408<br>19/24                | 0.302<br>17.430<br>2/ 7                    |
| JUL                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 86.900<br>211.818<br>23/17                | 0.000<br>0.000<br>31/ 1                    |
| AUG                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 84.750<br>211.528<br>12/24                | 0.078<br>11.196<br>4/ 7                    |
| SEP                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 63.386<br>200.896<br>5/24                 | 2.207<br>21.787<br>11/ 7                   |
| OCT                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 46.689<br>177.243<br>1/24                 | 43.115<br>349.305<br>20/ 8                 |
| NOV                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 45.341<br>136.810<br>6/24                 | 118.730<br>425.118<br>3/ 6                 |
| DEC                  | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 49.675<br>139.125<br>9/17                 | 194.997<br>512.947<br>13/ 8                |
| ONE YEAR<br>USE/PEAK |  |   | 951.158<br>559.457                         |





**COMPUTER ENERGY SIMULATIONS**

**BLDG. 7656  
TRAINING BUILDINGS**



DENVER - ATLANTA

PROJECT: FEASIBILITY STUDY FOR  
INSTALLATION OF UMCS  
LOCATION: FORT RILEY, KANSAS

EMC NO: 1406-001  
CALC. BY: AJN  
CHECKED BY: CEL  
DATE: 05-Jul-95

BUILDING NO.: 7656  
BLDG. TYPE: GEN INSTR BUILDING

### ENERGY CONSTANT CALCULATIONS

|                | BASERUN | RUN1    | RUN2    | RUN3    | RUN4    | RUN5    |
|----------------|---------|---------|---------|---------|---------|---------|
| HEATING (MBtu) | 240.4   | 183.8   | 181.2   | 459.8   | 83.2    | 148.2   |
| COOLING (kWH)  | 240,275 | 223,844 | 235,391 | 219,678 | 240,275 | 235,573 |

|                |                                   |
|----------------|-----------------------------------|
| SUPPLY AIR FAN | 14,560 CFM                        |
| FLOOR AREA     | 11,308 FT <sup>2</sup>            |
| CFM/           | 1456 CFM                          |
| UA             | 1852 BTU/HR. °F                   |
| BLDG CONSTR.   | 2 (1 FOR LIGHT )<br>(2 FOR HEAVY) |

| EZDOE COMPUTER RUN DEFINITION: |                             |
|--------------------------------|-----------------------------|
| BASERUN                        | EXISTING OPERATION          |
| RUN1                           | NIGHT SETBACK               |
| RUN2                           | DDC CONTROL                 |
| RUN3                           | ECONOMIZER                  |
| RUN4                           | NIGHTTIME INFILTRATION (OA) |
| RUN5                           | DAYTIME INFILTRATION (OA)   |

| HOURS OF OCCUPANCY |                   |      | ANNUAL HEATING & COOLING HOURS |                            |
|--------------------|-------------------|------|--------------------------------|----------------------------|
| M-F                | 700               | 2100 | 70 HR                          | HR. ON HEATING 2270 HR/YR  |
| SAT.               | 0                 | 0    | 0 HR                           | HR. ON COOLING 1380 HR/YR  |
| SUN.               | 0                 | 0    | 0 HR                           | HR. OFF HEATING 3178 HR/YR |
|                    | TOTAL OCCUPY HR.  |      | 70 HR/WK                       | HR. OFF COOLING 1932 HR/YR |
|                    | TOTAL UNOCC. HR.  |      | 98 HR/WK                       |                            |
|                    | ANNUAL OCCUPY HR. |      | 3650 HR/YR                     |                            |
|                    | ANNUAL UNOCC. HR. |      | 5110 HR/YR                     |                            |

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 5448 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 3312 HR/YR  
HRS SAVED (HTG ONLY) 5448 - 2270 = 3178 HR/YR  
HRS SAVED (CLG ONLY) 3312 - 1380 = 1932 HR/YR

|           |   |   |               |   |                     |
|-----------|---|---|---------------|---|---------------------|
| HOAUHC    | 240.35 MBtu   | - | 83.17 MBtu    | = | 2.11E+01 Btu/CFM-HR |
|           | 1456 CFM  | x | 5110 HR/YR    |   |                     |
| HOAUH     | 240.35 MBtu   | - | 83.17 MBtu    | = | 3.40E+01 Btu/CFM-HR |
|           | 1456 CFM  | x | 3178 HR/YR    |   |                     |
| COAUHC    | 240,275.4 kWH   | - | 240,275.4 kWH | = | 0.00E+00 kWH/CFM-HR |
|           | 1456 CFM  | x | 5110 HR/YR    |   |                     |
| COAUC     | 240,275.4 kWH   | - | 240,275.4 kWH | = | 0.00E+00 kWH/CFM-HR |
|           | 1456 CFM  | x | 1932 HR/YR    |   |                     |
| HOAOHC    | 240.35 MBtu   | - | 148.17 MBtu   | = | 1.73E+01 Btu/CFM-HR |
|           | 1456 CFM  | x | 3650 HR/YR    |   |                     |
| HOAOH     | 240.35 MBtu   | - | 148.17 MBtu   | = | 2.79E+01 Btu/CFM-HR |
|           | 1456 CFM  | x | 2270 HR/YR    |   |                     |
| COAOHC    | 240,275.4 kWH   | - | 235,572.8 kWH | = | 8.85E-04 kWH/CFM-HR |
|           | 1456 CFM  | x | 3650 HR/YR    |   |                     |
| COAOC     | 240,275.4 kWH   | - | 235,572.8 kWH | = | 2.34E-03 kWH/CFM-HR |
|           | 1456 CFM  | x | 1380 HR/YR    |   |                     |
| DC DUTY   | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | = | 0.17                |
| DC DEMAND | 1 / 6 (10 MINUTES PER HOUR)                           |   |               | = | 0.17                |
| ECC       | 223,844.1 kWH   | - | 219,677.7 kWH | = | 2.07E-04 kWH/CFM-HR |
|           | 14560 CFM   | x | 1380 HR/YR    |   |                     |
| ECHC      | 223,844.1 kWH   | - | 219,677.7 kWH | = | 7.84E-05 kWH/CFM-HR |
|           | 14560 CFM   | x | 3650 HR/YR    |   |                     |
| NSUCHC    | 240,275.4 kWH   | - | 223,844.1 kWH | = | 2.21E-04 kWH/CFM-HR |
|           | 14560 CFM   | x | 5110 HR/YR    |   |                     |
| NSUCC     | 240,275.4 kWH   | - | 223,844.1 kWH | = | 5.84E-04 kWH/CFM-HR |
|           | 14560 CFM   | x | 1932 HR/YR    |   |                     |
| DDCCHC    | 240,275.4 kWH   | - | 235,391.2 kWH | = | 9.19E-05 kWH/CFM-HR |
|           | 14560 CFM   | x | 3650 HR/YR    |   |                     |
| DDCCC     | 240,275.4 kWH   | - | 235,391.2 kWH | = | 2.43E-04 kWH/CFM-HR |
|           | 14560 CFM   | x | 1380 HR/YR    |   |                     |
| NSC       | 240.35 MBtu   | - | 183.8 MBtu    | = | 3.05E+04 Btu/UA     |
|           | 1852.0192 UA  |   |               |   |                     |
| DDCH      | 240.35 MBtu   | - | 181.18 MBtu   | = | 3.19E+04 Btu/UA     |
|           | 1852.0192 UA  |   |               |   |                     |
| OPT       | ( 2 HR/DAY X 240 DAY/YR )                             | - | 175 HR/YR     | = | 305 HR/YR           |
| CHWR      | (1.10 kW X 0.012 Eff. X 664 HRS X 2 Degrees of Reset) |   |               | = | 17.5 kWH/TON        |
| OAR       | 567 HR/YR   | x | 0.01          | = | 5.67 HR/YR          |



INPUT LOADS ..

\$-----\$  
\$ E Z - D O E L O A D S I N P U T \$  
\$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*  
  
LINE-4 \*BASELINE SIMULATION FOR BLDG.# 7656 \*  
LINE-5 \*GEN INST BLDG \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
LOADS-REPORT VERIFICATION=(LV-D)  
SUMMARY=(LS-C,LS-D)  
HOURLY-DATA-SAVE = YES ..  
  
BUILDING-LOCATION LATITUDE = 39.0  
LONGITUDE = 96.5  
ALTITUDE = 1065.  
TIME-ZONE = 6  
GROSS-AREA = 11313.5  
SHIELDING-COEF = 0.29  
X-REF = 0.0  
Y-REF = 0.0 ..  
  
RUN-PERIOD JAN 1 1994 THRU DEC 31 1994 ..

## \$ SCHEDULES

LD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
  
LD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
  
LD\_M-TH/LT =DAY-SCHEDULE (1,6) (0.)  
(7) (0.5)  
(8,22) (1.)  
(23,24) (0.) ..  
  
LD\_FRI/LIT =DAY-SCHEDULE (1,6) (0.)  
(7) (0.5)  
(8,14) (1.)  
(15) (0.5)  
(16,24) (0.) ..  
  
LD\_M-TR/PE =DAY-SCHEDULE (1,6) (0.)  
(7) (0.35)  
(8,15) (0.7)  
(16) (0.85)  
(17,22) (1.)  
(23,24) (0.) ..

```
LD_FRI/PEO =DAY-SCHEDULE (1,6) (0.)
                    (7) (0.35)
                    (8,14) (0.7)
                    (15) (0.35)
                    (16,24) (0.) ..
```

```
LW_ON      =WEEK-SCHEDULE (ALL) LD_ON  ..
```

```
LW_OFF     =WEEK-SCHEDULE (ALL) LD_OFF ..
```

```
LW_LIT/EQU =WEEK-SCHEDULE (MON) LD_M-TH/LT
                    (TUE) LD_M-TH/LT
                    (WED) LD_M-TH/LT
                    (THU) LD_M-TH/LT
                    (FRI) LD_FRI/LIT
                    (SAT) LD_OFF
                    (SUN) LD_OFF
                    (HOL) LD_OFF ..
```

```
LW_PEOPLE  =WEEK-SCHEDULE (MON) LD_M-TR/PE
                    (TUE) LD_M-TR/PE
                    (WED) LD_M-TR/PE
                    (THU) LD_M-TR/PE
                    (FRI) LD_FRI/PEO
                    (SAT) LD_OFF
                    (SUN) LD_OFF
                    (HOL) LD_OFF ..
```

```
L_FULL_ON  =SCHEDULE THRU DEC 31 LW_ON  ..
```

```
L_FULL_OFF =SCHEDULE THRU DEC 31 LW_OFF ..
```

```
$ LIGHTING AND EQUIP SCHE
```

```
L_LITS/EQU =SCHEDULE THRU DEC 31 LW_LIT/EQU ..
```

```
$ PEOPLE SCHEDULE
```

```
L_PEOPLE   =SCHEDULE THRU DEC 31 LW_PEOPLE ..
```

#### \$ CONSTRUCTION TYPES

##### \$ BUILT-UP ROOF IN MEZZIN AREA

```
ROF-MEZZ =LAYERS      MATERIAL=(HF-E2,IN03,HF-E4,HF-C14,HF-E4,AC01)
                    THICKNESS=(0.042,0.511,0.000,0.333,0.000,0.031) ..
R-MEZZIN =CONSTRUCTION LAYERS = ROF-MEZZ
                    ABSORPTANCE = 0.800
                    ROUGHNESS = 1 ..
```

##### \$ BUILT-UP ROOF OVER OLD DIN AREA



DIN-ROOF =LAYERS MATERIAL=(HF-E2,HF-E4,IN03,GP04,HF-E4,AC01)  
 THICKNESS=(0.042,0.000,0.511,0.063,0.000,0.031) ..  
 ROOF-DIN =CONSTRUCTION LAYERS = DIN-ROOF  
 ABSORPTANCE = 0.800  
 ROUGHNESS = 1 ..

## \$ EXTERIOR WALL BRICK,INSL,BRICK

WALL-1 =LAYERS MATERIAL=(BK01,AL11,IN23,CB06,GP01) I-F-R= 0.6100  
 THICKNESS=(0.333,0.000,0.167,0.500,0.042) ..  
 EXWALL-1 =CONSTRUCTION LAYERS = WALL-1  
 ABSORPTANCE = 0.880  
 ROUGHNESS = 2 ..

## \$ SLAB FLOOR

FLOOR =CONSTRUCTION U-VALUE = 0.020  
 ABSORPTANCE = 0.610  
 ROUGHNESS = 5 ..

## \$ STANDARD METAL DOOR

METAL-DR =LAYERS MATERIAL=(HF-A3,IN34,HF-A3)  
 THICKNESS=(0.005,0.104,0.005) ..  
 DOOR-MET =CONSTRUCTION LAYERS = METAL-DR  
 ABSORPTANCE = 0.860  
 ROUGHNESS = 5 ..

2\_PN\_STD =GLASS-TYPE GLASS-TYPE-CODE = 2  
 PANES = 2 ..

## \$ SPACE DESCRIPTION

S-PER\_ZONE =SPACE AREA = 1620.0 VOLUME = 22275.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 225.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.5  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITS/EQU  
 EQUIP-SCHEDULE = L\_LITS/EQU EQUIPMENT-W/SQFT = 0.37  
 FURN-FRACTION = 0.3 FURN-WEIGHT = 1.  
 INF-METHOD = NONE ..

E-W HEIGHT = 18.0 WIDTH = 39.0 CONS = EXWALL-1  
 AZIMUTH = 180 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.0 WIDTH = 5.3 G-T = 2\_PN\_STD  
 MULTIPLIER = 2.0 SETBACK = 0.3  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 15.0 WIDTH = 108.0 CONS = FLOOR ..

ROOF HEIGHT = 15.0 WIDTH = 31.5 CONS = R-MEZZIN  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

E-W HEIGHT = 12.0 WIDTH = 84.0 CONS = EXWALL-1  
 AZIMUTH = 180 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 8.0 WIDTH = 4.0 G-T = 2\_PN\_STD  
 MULTIPLIER = 18.0 SETBACK = 0.3  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
 SETBACK = 0.3 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

ROOF HEIGHT = 15.0 WIDTH = 76.5 CONS = ROOF-DIN  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

W-PER\_ZONE =SPACE AREA = 1069.5 VOLUME = 19251.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 225.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.5  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITS/EQU  
 EQUIP-SCHEDULE = L\_LITS/EQU EQUIPMENT-W/SQFT = 0.37  
 FURN-FRACTION = 0.3 FURN-WEIGHT = 1.  
 INF-METHOD = NONE ..

E-W HEIGHT = 18.0 WIDTH = 86.3 CONS = EXWALL-1  
 AZIMUTH = 270 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.8 WIDTH = 6.0 G-T = 2\_PN\_STD  
 MULTIPLIER = 4.0 SETBACK = 0.3  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
 SETBACK = 0.3 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 OVERHANG-A = 5.  
 OVERHANG-B = 3. OVERHANG-W = 15. OVERHANG-D = 5. ..

U-W HEIGHT = 15.0 WIDTH = 71.3 CONS = FLOOR ..

ROOF HEIGHT = 15.0 WIDTH = 71.3 CONS = R-MEZZIN  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

E-PER\_ZONE =SPACE AREA = 1762.4 VOLUME = 21149.0  
 TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
 PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 225.0  
 PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
 LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.5  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITS/EQU  
 EQUIP-SCHEDULE = L\_LITS/EQU EQUIPMENT-W/SQFT = 0.37  
 FURN-FRACTION = 0.3 FURN-WEIGHT = 1.  
 INF-METHOD = NONE ..

E-W HEIGHT = 12.0 WIDTH = 86.3 CONS = EXWALL-1

AZIMUTH = 90 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 8.0 WIDTH = 4.0 G-T = 2\_PN\_STD  
MULTIPLIER = 6.0 SETBACK = 0.3  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 12.0 WIDTH = 13.0 CONS = EXWALL-1  
AZIMUTH = 180 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
MULTIPLIER = 2.0 SETBACK = 0.3  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
OVERHANG-A = 1. OVERHANG-B = 2. OVERHANG-W = 10.  
OVERHANG-D = 10. ..

E-W HEIGHT = 12.0 WIDTH = 13.0 CONS = EXWALL-1  
AZIMUTH = 0 SKY-FORM-FACTOR = 0.5  
GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
MULTIPLIER = 2.0 SETBACK = 0.3  
SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5  
OVERHANG-A = 1. OVERHANG-B = 2. OVERHANG-W = 10.  
OVERHANG-D = 10. ..

U-W HEIGHT = 20.5 WIDTH = 86.0 CONS = FLOOR ..

ROOF HEIGHT = 20.5 WIDTH = 86.0 CONS = ROOF-DIN  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

CORE\_ZONE =SPACE AREA = 5236.0 VOLUME = 70938.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 225.0  
PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0  
LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.5  
LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITS/EQU  
EQUIP-SCHEDULE = L\_LITS/EQU EQUIPMENT-W/SQFT = 0.37  
FURN-FRACTION = 0.3 FURN-WEIGHT = 1.  
INF-METHOD = NONE ..

ROOF HEIGHT = 24.0 WIDTH = 56.3 CONS = R-MEZZIN  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

ROOF HEIGHT = 56.3 WIDTH = 69.0 CONS = ROOF-DIN  
TILT = 0 SKY-FORM-FACTOR = 1.0 ..

U-W HEIGHT = 56.3 WIDTH = 93.0 CONS = FLOOR ..

N-PER\_ZONE =SPACE AREA = 1620.0 VOLUME = 22275.0  
TEMPERATURE = (73.) ZONE-TYPE = CONDITIONED  
PEOPLE-SCHEDULE = L\_PEOPLE AREA/PERSON = 225.0  
PEOPLE-HG-LAT = 625.0 PEOPLE-HG-SENS = 375.0

LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.5  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITS/EQU  
 EQUIP-SCHEDULE = L\_LITS/EQU EQUIPMENT-W/SQFT = 0.37  
 FURN-FRACTION = 0.3 FURN-WEIGHT = 1.  
 INF-METHOD = NONE ..

E-W HEIGHT = 18.0 WIDTH = 39.0 CONS = EXWALL-1  
 AZIMUTH = 0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.0 WIDTH = 4.0 G-T = 2\_PN\_STD  
 SETBACK = 0.3 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 12.0 WIDTH = 84.0 CONS = EXWALL-1  
 AZIMUTH = 0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 8.0 WIDTH = 4.0 G-T = 2\_PN\_STD  
 MULTIPLIER = 18.0 SETBACK = 0.3  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
 SETBACK = 0.3 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 15.0 WIDTH = 108.0 CONS = FLOOR ..

ROOF HEIGHT = 15.0 WIDTH = 31.5 CONS = R-MEZZIN  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

ROOF HEIGHT = 15.0 WIDTH = 76.5 CONS = ROOF-DIN  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*BASELINE SIMULATION FOR BLDG.# 7656 \*

LINE-5 \*GEN INST BLDG \* ..

ABORT ERRORS ..

DIAGNOSTIC WARNINGS ..

SYSTEMS-REPORT VERIFICATION=(SV-A)

SUMMARY=(SS-A,SS-B,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

SD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
 SD\_SM\_CL =DAY-SCHEDULE (1,24) (72.) ..  
 SD\_WT\_HT =DAY-SCHEDULE (1,24) (74.) ..  
 SD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
 SD\_SM\_HT =DAY-SCHEDULE (1,24) (71.8) ..  
 SD\_WT\_CL =DAY-SCHEDULE (1,13) (74.2)  
                                   (14) (74.27)  
                                   (15,24) (74.2) ..  
 SD\_OA% =DAY-SCHEDULE (1,24) (0.1) ..  
  
 SW\_ON =WEEK-SCHEDULE (ALL) SD\_ON ..  
  
 SW\_OFF =WEEK-SCHEDULE (ALL) SD\_OFF ..  
  
 SW\_WT\_HT =WEEK-SCHEDULE (ALL) SD\_WT\_HT ..  
  
 SW\_SM\_CL =WEEK-SCHEDULE (ALL) SD\_SM\_CL ..  
  
 SW\_SM\_HT =WEEK-SCHEDULE (ALL) SD\_SM\_HT ..  
  
 SW\_WT\_CL =WEEK-SCHEDULE (ALL) SD\_WT\_CL ..  
  
 SW\_OA% =WEEK-SCHEDULE (ALL) SD\_OA% ..  
  
 S\_FULL\_ON =SCHEDULE THRU DEC 31 SW\_ON ..  
  
 S\_FULL\_OFF =SCHEDULE THRU DEC 31 SW\_OFF ..  
  
 \$ HEATING SEASON  
 S\_HE\_SCHD =SCHEDULE THRU MAY 15 SW\_ON  
                                   THRU OCT 1 SW\_OFF  
                                   THRU DEC 31 SW\_ON ..  
  
 \$ COOLING SEASON  
 S\_CL\_SCHD =SCHEDULE THRU MAY 15 SW\_OFF  
                                   THRU OCT 1 SW\_ON  
                                   THRU DEC 31 SW\_OFF ..  
  
 \$ HEATING SET TEMP  
 S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
                                   THRU OCT 1 SW\_SM\_HT  
                                   THRU DEC 31 SW\_WT\_HT ..  
  
 \$ COOLING SET TEMP  
 S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
                                   THRU OCT 1 SW\_SM\_CL  
                                   THRU DEC 31 SW\_WT\_CL ..  
  
 S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
 THRU JAN 15 SW\_ON  
 THRU AUG 22 SW\_OFF  
 THRU AUG 23 SW\_ON  
 THRU DEC 31 SW\_OFF ..

## \$ ZONE DESCRIPTION

S-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

W-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

E-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

CORE\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

N-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
 HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
 ZONE-TYPE = CONDITIONED  
 THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
 SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ-SYSTEM =SYSTEM SYSTEM-TYPE = MZS  
 MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
 HEATING-SCHEDULE = S\_HE\_SCHED  
 COOLING-SCHEDULE = S\_CL\_SCHED PREHEAT-T = 0.0  
 OA-CONTROL = FIXED SUPPLY-CFM = 14000.  
 RATED-CFM = 14000. MIN-OUTSIDE-AIR = 0.1  
 MIN-AIR-SCH = S\_OA MAX-OA-FRACTION = 0.1  
 SUPPLY-DELTA-T = 2.7 SUPPLY-KW = 0.00088  
 MOTOR-PLACEMENT = OUTSIDE-AIRFLOW  
 NIGHT-CYCLE-CTRL = STAY-OFF NIGHT-VENT-DT = 0.0  
 MIN-CFM-RATIO = 1.0 COOLING-CAPACITY = 402500.  
 COOL-SH-CAP = 362250. HEATING-CAPACITY = -1225000.  
 SIZING-OPTION = COINCIDENT RETURN-AIR-PATH = DUCT

ZONE-NAMES = (S-PER\_ZONE, N-PER\_ZONE, W-PER\_ZONE,  
E-PER\_ZONE, CORE\_ZONE) ..

## \$ HOURLY REPORT DESCRIPTION

AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = MZ-SYSTEM  
VARIABLE-LIST = (3,5,6,18,18,17) ..  
ZONE-N-BLK =REPORT-BLOCK VARIABLE-TYPE = N-PER\_ZONE  
VARIABLE-LIST = (17,18,7,31) ..  
ZONE-S-BLK =REPORT-BLOCK VARIABLE-TYPE = S-PER\_ZONE  
VARIABLE-LIST = (17,18,7,31) ..  
HRLY-ZN-N = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
REPORT-BLOCK = (ZONE-N-BLK)  
..  
HRLY-ZN-S = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
REPORT-BLOCK = (ZONE-S-BLK)  
..  
HRLY-AHU = HOURLY-REPORT REPORT-SCHEDULE = S\_HRLY-RPT  
REPORT-BLOCK = (AHU-BLOCK)  
..  
END ..  
COMPUTE SYSTEMS ..  
  
INPUT PLANT ..

\$-----\$  
\$ E Z - D O E P L A N T S I N P U T \$  
\$-----\$

## \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
LINE-3 \* DENVER, CO 80227 \*  
  
LINE-4 \*BASELINE SIMULATION FOR BLDG.# 7656 \*  
LINE-5 \*GEN INST BLDG \* ..

ABORT ERRORS ..  
DIAGNOSTIC WARNINGS ..  
PLANT-REPORT VERIFICATION=(PV-A)  
SUMMARY=(PS-B,BEPS)  
HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

PD\_ON =DAY-SCHEDULE (1,24) (1.) ..  
  
PD\_OFF =DAY-SCHEDULE (1,24) (0.) ..  
  
PW\_ON =WEEK-SCHEDULE (ALL) PD\_ON ..  
  
PW\_OFF =WEEK-SCHEDULE (ALL) PD\_OFF ..

## \$ HEATING SEASON

P\_HEAT =SCHEDULE THRU MAY 15 PW\_ON  
 THRU OCT 1 PW\_OFF  
 THRU DEC 31 PW\_ON ..

## \$ COOLING SEASON

P\_COOL =SCHEDULE THRU MAY 15 PW\_OFF  
 THRU OCT 1 PW\_ON  
 THRU DEC 31 PW\_OFF ..

## \$ EQUIPMENT DESCRIPTION

BOILER-HW =PLANT-EQUIPMENT TYPE = HW-BOILER  
 SIZE = -999. ..

CHILLER-RC =PLANT-EQUIPMENT TYPE = HERM-REC-CHLR  
 SIZE = -999. INSTALLED-NUMBER = 2  
 MAX-NUMBER-AVAIL = 2 ..

PLANT-PARAMETERS BOILER-FUEL = NATURAL-GAS STM-BOILER-HIR = 1.33  
 HERM-CENT-COND-TYPE = AIR HERM-REC-COND-TYPE = AIR  
 HCIRC-HEAD = 30.0 ..

PART-LOAD-RATIO TYPE = ELEC-STM-BOILER  
 MIN-RATIO = 0.0099 MAX-RATIO = 1.0000  
 OPERATING-RATIO = 1.0000 ELEC-INPUT-RATIO = 1.0000 ..

ENERGY-RESOURCE RESOURCE = ELECTRICITY ..  
 ENERGY-RESOURCE RESOURCE = NATURAL-GAS ..

HEAT-SCH =LOAD-ASSIGNMENT TYPE = HEATING  
 OPERATION-MODE = RUN-NEEDED  
  
 LOAD-RANGE = 0.000  
 PLANT-EQUIPMENT = BOILER-HW  
 NUMBER = 1 ..

COOL-SCH =LOAD-ASSIGNMENT TYPE = COOLING  
 OPERATION-MODE = RUN-NEEDED  
  
 LOAD-RANGE = 0.000  
 PLANT-EQUIPMENT = CHILLER-RC  
 NUMBER = 2 ..

END ..  
 COMPUTE PLANT ..  
 STOP ..



NUMBER OF EXTERIOR SURFACES 16 RECTANGULAR 16 OTHER 0  
(U-VALUE INCLUDES INSIDE AIR FILM PLUS OUTSIDE AIR FILM AT 7.5 MPH WINDSPEED )

| SURFACE    | SPACE      | U-VALUE<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) | U-VALUE<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) | W-A-L-T-H<br>(INCHES) | U-VALUE<br>(BTU/HR-SQFT-F) | AREA<br>(SQFT) | AZIMUTH   |
|------------|------------|----------------------------|----------------|----------------------------|----------------|-----------------------|----------------------------|----------------|-----------|
| E-PER_ZONE | E-PER_ZONE | 0.000                      | 0.00           | 0.092                      | 156.00         | 0.092                 | 0.092                      | 156.00         | NORTH     |
| N-PER_ZONE | N-PER_ZONE | 0.490                      | 16.00          | 0.092                      | 686.00         | 0.101                 | 0.101                      | 702.00         | NORTH     |
| N-PER_ZONE | N-PER_ZONE | 0.490                      | 576.00         | 0.092                      | 432.00         | 0.320                 | 0.320                      | 1008.00        | NORTH     |
| E-PER_ZONE | E-PER_ZONE | 0.490                      | 192.00         | 0.092                      | 843.60         | 0.166                 | 0.166                      | 1035.60        | EAST      |
| S-PER_ZONE | E-PER_ZONE | 0.490                      | 576.00         | 0.092                      | 432.00         | 0.320                 | 0.320                      | 1008.00        | SOUTH     |
| S-PER_ZONE | S-PER_ZONE | 0.490                      | 42.40          | 0.092                      | 659.60         | 0.116                 | 0.116                      | 702.00         | SOUTH     |
| E-PER_ZONE | E-PER_ZONE | 0.000                      | 0.00           | 0.092                      | 156.00         | 0.092                 | 0.092                      | 156.00         | SOUTH     |
| W-PER_ZONE | E-PER_ZONE | 0.490                      | 115.20         | 0.092                      | 1438.20        | 0.122                 | 0.122                      | 1553.40        | WEST      |
| W-PER_ZONE | W-PER_ZONE | 0.000                      | 0.00           | 0.036                      | 1069.50        | 0.036                 | 0.036                      | 1069.50        | ROOF      |
| E-PER_ZONE | W-PER_ZONE | 0.000                      | 0.00           | 0.040                      | 1763.00        | 0.040                 | 0.040                      | 1763.00        | ROOF      |
| CORE_ZONE  | CORE_ZONE  | 0.000                      | 0.00           | 0.036                      | 1351.20        | 0.036                 | 0.036                      | 1351.20        | ROOF      |
| CORE_ZONE  | CORE_ZONE  | 0.000                      | 0.00           | 0.040                      | 3884.70        | 0.040                 | 0.040                      | 3884.70        | ROOF      |
| S-PER_ZONE | CORE_ZONE  | 0.000                      | 0.00           | 0.040                      | 1147.50        | 0.040                 | 0.040                      | 1147.50        | ROOF      |
| S-PER_ZONE | S-PER_ZONE | 0.000                      | 0.00           | 0.036                      | 472.50         | 0.036                 | 0.036                      | 472.50         | ROOF      |
| N-PER_ZONE | S-PER_ZONE | 0.000                      | 0.00           | 0.036                      | 472.50         | 0.036                 | 0.036                      | 472.50         | ROOF      |
| N-PER_ZONE | N-PER_ZONE | 0.000                      | 0.00           | 0.040                      | 1147.50        | 0.040                 | 0.040                      | 1147.50        | ROOF      |
| S-PER_ZONE | S-PER_ZONE | 0.000                      | 0.00           | 0.020                      | 1620.00        | 0.020                 | 0.020                      | 1620.00        | UNDERGRND |
| W-PER_ZONE | S-PER_ZONE | 0.000                      | 0.00           | 0.020                      | 1069.50        | 0.020                 | 0.020                      | 1069.50        | UNDERGRND |
| E-PER_ZONE | W-PER_ZONE | 0.000                      | 0.00           | 0.020                      | 1763.00        | 0.020                 | 0.020                      | 1763.00        | UNDERGRND |
| CORE_ZONE  | E-PER_ZONE | 0.000                      | 0.00           | 0.020                      | 5235.90        | 0.020                 | 0.020                      | 5235.90        | UNDERGRND |
| N-PER_ZONE | CORE_ZONE  | 0.000                      | 0.00           | 0.020                      | 1620.00        | 0.020                 | 0.020                      | 1620.00        | UNDERGRND |

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EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 14:23:31 LDL RUN 1
DENVER, CO 80227 BASELINE SIMULATION FOR BLDG.# 7656 GEN INST BLDG TOPEKA, KS
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PROJECT IV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT

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|             | AVERAGE<br>U-VALUE/GLASS<br>(BTU/HR-SQFT-F) | AVERAGE<br>U-VALUE/WALLS<br>(BTU/HR-SQFT-F) | AVERAGE U-VALUE<br>WALLS+GLASS<br>(BTU/HR-SQFT-F) | GLASS<br>AREA<br>(SQFT) | OPAQUE<br>AREA<br>(SQFT) | GLASS+OPAQUE<br>AREA<br>(SQFT) |
|-------------|---|---|---|-------------------------|--------------------------|--------------------------------|
| NORTH       | 0.490                                       | 0.092                                       | 0.218   | 592.00                  | 1274.00                  | 1866.00                        |
| EAST        | 0.490                                       | 0.092                                       | 0.166   | 192.00                  | 843.60                   | 1035.60                        |
| SOUTH       | 0.490                                       | 0.092                                       | 0.224   | 618.40                  | 1247.60                  | 1866.00                        |
| WEST        | 0.490                                       | 0.092                                       | 0.122   | 115.20                  | 1438.20                  | 1553.40                        |
| ROOF        | 0.000                                       | 0.039                                       | 0.039   | 0.00                    | 11308.40                 | 11308.40                       |
| ALL WALLS   | 0.490                                       | 0.092                                       | 0.188   | 1517.60                 | 4803.40                  | 6321.00                        |
| WALLS+ROOFS | 0.490                                       | 0.055                                       | 0.092   | 1517.60                 | 16111.80                 | 17629.40                       |
| UNDERGRND   | 0.000                                       | 0.020                                       | 0.020   | 0.00                    | 11308.40                 | 11308.40                       |
| BUILDING    | 0.490                                       | 0.041                                       | 0.064   | 1517.60                 | 27420.20                 | 28937.80                       |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 14:23:31 LDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG.# 7656 GEN INST BLDG  
 REPORT- LS-C BUILDING PEAK LOAD COMPONENTS TOPEKA, KS

\*\*\* BUILDING \*\*\*

FLOOR AREA 11308 SQFT 1051 SQMT  
 VOLUME 155888 CUFT 4415 CUMT

TIME DRY-BULB TEMP WET-BULB TEMP  
 COOLING LOAD  
 AUG 11 5PM  
 98F 37C  
 71F 22C  
 HEATING LOAD  
 JAN 15 8AM  
 -6F -21C  
 -7F -22C

|                      | SENSIBLE |            | LATENT   |         | SENSIBLE |            |
|----------------------|----------|------------|----------|---------|----------|------------|
|                      | (KBTU/H) | ( KW )     | (KBTU/H) | ( KW )  | (KBTU/H) | ( KW )     |
| WALLS                | 5.256    | 1.539      | 0.000    | 0.000   | -31.361  | -9.185     |
| ROOFS                | 19.070   | 5.585      | 0.000    | 0.000   | -37.338  | -10.935    |
| GLASS CONDUCTION     | 17.334   | 5.077      | 0.000    | 0.000   | -58.329  | -17.083    |
| GLASS SOLAR          | 54.360   | 15.921     | 0.000    | 0.000   | 2.663    | 0.780      |
| DOOR                 | 0.905    | 0.265      | 0.000    | 0.000   | -2.437   | -0.714     |
| INTERNAL SURFACES    | 0.000    | 0.000      | 0.000    | 0.000   | 0.000    | 0.000      |
| UNDERGROUND SURFACES | -1.070   | -0.313     | 0.000    | 0.000   | -6.494   | -1.902     |
| OCCUPANTS TO SPACE   | 16.442   | 4.815      | 31.411   | 9.199   | 0.335    | 0.098      |
| LIGHT TO SPACE       | 52.660   | 15.423     | 0.000    | 0.000   | 2.093    | 0.613      |
| EQUIPMENT TO SPACE   | 13.404   | 3.926      | 0.000    | 0.000   | 0.350    | 0.103      |
| PROCESS TO SPACE     | 0.000    | 0.000      | 0.000    | 0.000   | 0.000    | 0.000      |
| INFILTRATION         | 0.000    | 0.000      | 0.000    | 0.000   | 0.000    | 0.000      |
| TOTAL                | 178.361  | 52.238     | 31.411   | 9.199   | -130.516 | -38.225    |
| TOTAL LOAD           | 209.772  | KBTU/H     | 61.437   | KW      | -130.516 | KBTU/H     |
| TOTAL LOAD / AREA    | 18.55    | BTU/H.SQFT | 58.482   | W /SQMT | 11.542   | BTU/H.SQFT |
|                      |          |            |          |         |          | W /SQMT    |

\*\*\*\*\*  
 \* NOTE 1) THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR  
 \* LOADS  
 \* 2) TIMES GIVEN IN STANDARD TIME FOR THE LOCATION  
 \* IN CONSIDERATION  
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| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 14:23:31 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|------------------------------------|---------------------------------|
| DENVER, CO 80227 BASELINE SIMULATION FOR BLDG.# 7656 GEN INST BLDG TOPEKA, KS                  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-SYSTEM  |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| ----- C O O L I N G ----- H E A T I N G ----- E L E C -----                                    |                             |                         |                      |                      |                             |                         |                      |                      |   |                                    |                                 |
| MONTH  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | ELEC-<br>TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN  | 0.00000                     |                         |                      |                      | -49.079                     | 15                      | 8                    | -7.F                 | -215.482                                | 15412.                             | 33.457                          |
| FEB  | 0.00000                     |                         |                      |                      | -29.981                     | 3                       | 6                    | -2.F                 | -168.064                                | 13870.                             | 33.457                          |
| MAR  | 0.00000                     |                         |                      |                      | -15.453                     | 14                      | 6                    | 15.F                 | -139.597                                | 16067.                             | 33.457                          |
| APR  | 0.00000                     |                         |                      |                      | -1.707                      | 5                       | 6                    | 31.F                 | -40.777                                 | 14958.                             | 33.457                          |
| MAY  | 47.26222                    | 16                      | 2                    | 62.F                 | -0.692                      | 10                      | 23                   | 60.F                 | -13.394                                 | 15412.                             | 33.457                          |
| JUN  | 106.15520                   | 27                      | 17                   | 89.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 15444.                             | 33.457                          |
| JUL  | 122.71164                   | 13                      | 19                   | 89.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 14926.                             | 33.457                          |
| AUG  | 125.71970                   | 24                      | 17                   | 95.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 16067.                             | 33.457                          |
| SEP  | 79.92394                    | 7                       | 17                   | 92.F                 | 0.000                       |                         |                      |                      | 0.000                                   | 14958.                             | 33.457                          |
| OCT  | 1.18942                     | 1                       | 17                   | 85.F                 | -1.917                      | 2                       | 2                    | 64.F                 | -42.585                                 | 15084.                             | 33.457                          |
| NOV  | 0.00000                     |                         |                      |                      | -11.673                     | 13                      | 6                    | 25.F                 | -102.334                                | 14947.                             | 33.457                          |
| DEC  | 0.00000                     |                         |                      |                      | -41.107                     | 12                      | 6                    | 3.F                  | -180.300                                | 15254.                             | 33.457                          |
| TOTAL  | 482.962                     |                         |                      |                      | -151.608                    |                         |                      |                      | -215.482                                | 182382.                            | 33.457                          |
| MAX  |                             |                         |                      |                      |                             |                         |                      |                      | 406.262                                 |                                    |                                 |

| EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 14:23:31 SDL RUN 1 |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
|--|--------------------------|--------------------------|--|-------------------|----------------------------|----------------------------|------------------------------|---------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 BASELINE SIMULATION FOR BLDG.# 7656 GEN INST BLDG TOPEKA, KS                        |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOADS SUMMARY FOR MZ-SYSTEM  |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| ----- N U M B E R O F H O U R S -----  |                          |                          |  |                   |                            |                            |                              |                           |                                      |  |  |
| MONTH  | HOURS<br>COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | HOURS<br>COINCIDENT<br>COOL-HEAT<br>LOAD | HOURS<br>FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | COINCIDENT LOADS--<br>HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN  | 0                        | 744                      | 0  | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -15.191  | 12.320   |
| FEB  | 0                        | 672                      | 0  | 0                 | 672                        | 0                          | 672                          | 0                         | 0                                    | -11.925  | 12.320   |
| MAR  | 0                        | 744                      | 0  | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -10.757  | 12.320   |
| APR  | 0                        | 720                      | 0  | 0                 | 720                        | 0                          | 720                          | 0                         | 0                                    | -5.331   | 12.320   |
| MAY  | 384                      | 360                      | 0  | 0                 | 360                        | 384                        | 744                          | 0                         | 0                                    | 0.000  | 12.320   |
| JUN  | 720                      | 0                        | 0  | 0                 | 0                          | 720                        | 720                          | 0                         | 0                                    | 0.000  | 33.457   |
| JUL  | 744                      | 0                        | 0  | 0                 | 0                          | 744                        | 744                          | 0                         | 0                                    | 0.000  | 33.457   |
| AUG  | 744                      | 0                        | 0  | 0                 | 0                          | 744                        | 744                          | 0                         | 0                                    | 0.000  | 33.457   |
| SEP  | 678                      | 0                        | 0  | 0                 | 0                          | 720                        | 720                          | 0                         | 42                                   | 0.000  | 33.457   |
| OCT  | 16                       | 720                      | 0  | 8                 | 720                        | 24                         | 744                          | 0                         | 8                                    | 0.000  | 12.320   |
| NOV  | 0                        | 720                      | 0  | 0                 | 720                        | 0                          | 720                          | 0                         | 0                                    | -36.541  | 12.320   |
| DEC  | 0                        | 744                      | 0  | 0                 | 744                        | 0                          | 744                          | 0                         | 0                                    | -112.955   | 12.320   |
| ANNUAL   | 3286                     | 5424                     | 0  | 50                | 5424                       | 3336                       | 8760                         | 0                         | 50                                   |  |  |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 14:23:31 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG.# 7656 GEN INST BLDG  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>55.507<br>119.416<br>31/ 8 | NATURAL-GAS<br>72.409<br>271.597<br>15/ 8 |
|-----|--|---|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 49.597<br>119.416<br>28/ 9                | 46.912<br>220.897<br>3/ 6                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 56.300<br>119.416<br>30/ 8                | 25.685<br>189.474<br>14/ 6                |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 51.624<br>116.191<br>5/ 8                 | 4.901<br>69.569<br>5/ 6                   |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 71.011<br>227.276<br>31/18                | 2.186<br>24.822<br>10/23                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 92.810<br>227.888<br>28/17                | 0.000<br>0.000<br>30/ 1                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 97.191<br>233.983<br>13/17                | 0.000<br>0.000<br>31/ 1                   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 103.481<br>238.285<br>23/16               | 0.000<br>0.000<br>31/ 1                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 82.744<br>233.372<br>7/16                 | 0.000<br>0.000<br>30/ 1                   |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.643<br>115.260<br>26/19                | 5.244<br>72.523<br>2/ 2                   |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.309<br>119.416<br>10/ 8                | 20.388<br>147.223<br>13/ 6                |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 54.843<br>119.416<br>30/14                | 62.624<br>234.177<br>12/ 6                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             |   |   |
|     | ONE YEAR<br>USE/PEAK                             | 820.059<br>238.285                        | 240.351<br>271.597                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 14:23:31 PDL RUN 1  
 DENVER, CO 80227 BASELINE SIMULATION FOR BLDG.# 7656 GEN INST BLDG  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 9.81        | 240.35      |
| SPACE COOL      | 170.44      | 0.00        |
| HVAC AUX        | 385.52      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 203.97      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 50.32       | 0.00        |
| TOTAL           | 820.06      | 240.35      |

TOTAL SITE ENERGY 1060.41 MBTU 93.7 KBTU/SQFT-YR GROSS-AREA 93.8 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2702.99 MBTU 238.9 KBTU/SQFT-YR GROSS-AREA 239.0 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 1.3  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.5  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITS/EQU  
 EQUIP-SCHEDULE = L\_LITS/EQU EQUIPMENT-W/SQFT = 0.37  
 FURN-FRACTION = 0.3 FURN-WEIGHT = 1.  
 INF-METHOD = NONE ..

E-W HEIGHT = 18.0 WIDTH = 39.0 CONS = EXWALL-1  
 AZIMUTH = 0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.0 WIDTH = 4.0 G-T = 2\_PN\_STD  
 SETBACK = 0.3 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 12.0 WIDTH = 84.0 CONS = EXWALL-1  
 AZIMUTH = 0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 8.0 WIDTH = 4.0 G-T = 2\_PN\_STD  
 MULTIPLIER = 18.0 SETBACK = 0.3  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
 SETBACK = 0.3 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 15.0 WIDTH = 108.0 CONS = FLOOR ..

ROOF HEIGHT = 15.0 WIDTH = 31.5 CONS = R-MEZZIN  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

ROOF HEIGHT = 15.0 WIDTH = 76.5 CONS = ROOF-DIN  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #1 NIGHT SET BACK FOR BLDG.# 7656 \*

LINE-5 \*GEN INST BLDG \* ..

ABORT ERRORS ..

DIAGNOSTIC WARNINGS ..

SYSTEMS-REPORT VERIFICATION=(SV-A)

SUMMARY=(SS-A,SS-B,SS-C,SS-K,SS-O)

HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE (1,24) (1.) ..
SD_SM_CL_W =DAY-SCHEDULE (1,6) (85.)
              (7,22) (72.)
              (23,24) (85.) ..
SD_WT_HT_W =DAY-SCHEDULE (1,6) (55.)
              (7,22) (74.)
              (23,24) (55.) ..
SD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
SD_SM_HT_W =DAY-SCHEDULE (1,6) (83.)
              (7,22) (70.)
              (23,24) (83.) ..
SD_WT_CL_W =DAY-SCHEDULE (1,6) (57.)
              (7,22) (76.)
              (23,24) (57.) ..
SD_OA%     =DAY-SCHEDULE (1,24) (0.1) ..
SD_WT_HT_F =DAY-SCHEDULE (1,6) (55.)
              (7,15) (74.)
              (16,24) (55.) ..
SD_SM_CL_F =DAY-SCHEDULE (1,6) (85.)
              (7,15) (72.)
              (16,24) (85.) ..
SD_SM_HT_F =DAY-SCHEDULE (1,6) (83.)
              (7,15) (70.)
              (16,24) (83.) ..
SD_WT_CL_F =DAY-SCHEDULE (1,6) (57.)
              (7,15) (76.)
              (16,24) (57.) ..
SD_SM_HT_D =DAY-SCHEDULE (1,24) (83.) ..
SD_WT_CL_D =DAY-SCHEDULE (1,24) (57.) ..
SD_WT_HT_D =DAY-SCHEDULE (1,24) (55.) ..
SD_SM_CL_D =DAY-SCHEDULE (1,24) (85.) ..
SD_FAN_W   =DAY-SCHEDULE (1,6) (0.)
              (7,22) (1.)
              (23,24) (0.) ..
SD_FAN_F   =DAY-SCHEDULE (1,6) (0.)
              (7,15) (1.)
              (16,24) (0.) ..
SD_FAN_D   =DAY-SCHEDULE (1,24) (0.) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..
SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT   =WEEK-SCHEDULE (MON) SD_WT_HT_W
              (TUE) SD_WT_HT_W
              (WED) SD_WT_HT_W
              (THU) SD_WT_HT_W
              (FRI) SD_WT_HT_F
              (SAT) SD_WT_HT_D
              (SUN) SD_WT_HT_D
              (HOL) SD_WT_HT_D ..

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```
SW_SM_CL  =WEEK-SCHEDULE  (MON) SD_SM_CL_W
                          (TUE) SD_SM_CL_W
                          (WED) SD_SM_CL_W
                          (THU) SD_SM_CL_W
                          (FRI) SD_SM_CL_F
                          (SAT) SD_SM_CL_D
                          (SUN) SD_SM_CL_D
                          (HOL) SD_SM_CL_D ..
```

```
SW_SM_HT  =WEEK-SCHEDULE  (MON) SD_SM_HT_W
                          (TUE) SD_SM_HT_W
                          (WED) SD_SM_HT_W
                          (THU) SD_SM_HT_W
                          (FRI) SD_SM_HT_F
                          (SAT) SD_SM_HT_D
                          (SUN) SD_SM_HT_D
                          (HOL) SD_SM_HT_D ..
```

```
SW_WT_CL  =WEEK-SCHEDULE  (MON) SD_WT_CL_W
                          (TUE) SD_WT_CL_W
                          (WED) SD_WT_CL_W
                          (THU) SD_WT_CL_W
                          (FRI) SD_WT_CL_F
                          (SAT) SD_WT_CL_D
                          (SUN) SD_WT_CL_D
                          (HOL) SD_WT_CL_D ..
```

```
SW_OA%    =WEEK-SCHEDULE  (ALL) SD_OA% ..
```

```
SW_FAN    =WEEK-SCHEDULE  (MON) SD_FAN_W
                          (TUE) SD_FAN_W
                          (WED) SD_FAN_W
                          (THU) SD_FAN_W
                          (FRI) SD_FAN_F
                          (SAT) SD_FAN_D
                          (SUN) SD_FAN_D
                          (HOL) SD_FAN_D ..
```

```
S_FULL_ON =SCHEDULE THRU DEC 31 SW_ON ..
```

```
S_FULL_OFF =SCHEDULE THRU DEC 31 SW_OFF ..
```

# \$ HEATING SEASON

```
S_HE_SCHD =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON ..
```

# \$ COOLING SEASON

```
S_CL_SCHD =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF ..
```

# \$ HEATING SET TEMP

```
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT
```

THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HRLY-RPT =SCHEDULE THRU JAN 12 SW\_OFF  
THRU JAN 15 SW\_ON  
THRU AUG 18 SW\_OFF  
THRU AUG 20 SW\_ON  
THRU AUG 22 SW\_OFF  
THRU AUG 23 SW\_ON  
THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN ..

## \$ ZONE DESCRIPTION

S-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

W-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

E-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

CORE\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

N-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

```

MZ-SYSTEM =SYSTEM      SYSTEM-TYPE = MZS
                        MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
                        HEATING-SCHEDULE = S_HE_SCHED
                        COOLING-SCHEDULE = S_CL_SCHED  PREHEAT-T = 0.0
                        HEAT-CONTROL = COLDEST  COOL-CONTROL = WARMEST
                        OA-CONTROL = FIXED  SUPPLY-CFM = 14000.
                        RATED-CFM = 14000.  MIN-OUTSIDE-AIR = 0.1
                        MIN-AIR-SCH = S_OA%  MAX-OA-FRACTION = 0.1
                        FAN-SCHEDULE = S_FAN_CYC  SUPPLY-DELTA-T = 2.7
                        SUPPLY-KW = 0.00088
                        MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
                        NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  NIGHT-VENT-DT = 0.0
                        MIN-CFM-RATIO = 1.0  COOLING-CAPACITY = 402500.
                        COOL-SH-CAP = 362250.  HEATING-CAPACITY = -1225000.
                        SIZING-OPTION = COINCIDENT  RETURN-AIR-PATH = DUCT
                        ZONE-NAMES = (S-PER_ZONE, N-PER_ZONE, W-PER_ZONE,
                                      E-PER_ZONE, CORE_ZONE) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = MZ-SYSTEM
                        VARIABLE-LIST = (3,5,6,18,18,17) ..
ZONE-N-BLK =REPORT-BLOCK VARIABLE-TYPE = N-PER_ZONE
                        VARIABLE-LIST = (17,18,7,31) ..
ZONE-S-BLK =REPORT-BLOCK VARIABLE-TYPE = S-PER_ZONE
                        VARIABLE-LIST = (17,18,7,31) ..
HRLY-ZN-N  = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                        REPORT-BLOCK = (ZONE-N-BLK)
..
HRLY-ZN-S  = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                        REPORT-BLOCK = (ZONE-S-BLK)
..
HRLY-AHU   = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                        REPORT-BLOCK = (AHU-BLOCK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #1 NIGHT SET BACK FOR BLDG.# 7656      *
        LINE-5 *GEN INST BLDG                                * ..

```



EMC ENGINEERS INC. 80227 E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 15:32:42 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #1 NIGHT SET BACK FOR BLDG.# 7656 GEN INST BLDG  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>54.208<br>128.457<br>31/11 | NATURAL-GAS<br>57.021<br>637.745<br>17/ 7 |
|-----|--|---|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 54.208<br>128.457<br>31/11                | 57.021<br>637.745<br>17/ 7                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 49.527<br>128.457<br>28/10                | 34.176<br>601.818<br>7/ 7                 |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 56.480<br>128.457<br>21/ 8                | 19.423<br>445.976<br>7/ 7                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 51.804<br>118.055<br>5/ 8                 | 5.676<br>82.959<br>5/ 7                   |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 66.087<br>237.860<br>31/18                | 2.637<br>29.907<br>10/23                  |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 82.098<br>238.865<br>27/17                | 0.000<br>0.000<br>30/ 1                   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 80.207<br>237.721<br>13/17                | 0.000<br>0.000<br>31/ 1                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 89.976<br>251.666<br>22/16                | 0.000<br>0.000<br>31/ 1                   |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 74.445<br>245.989<br>6/16                 | 0.000<br>0.000<br>30/ 1                   |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.371<br>117.020<br>31/ 8                | 5.973<br>55.805<br>31/ 7                  |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.319<br>128.457<br>14/ 8                | 13.065<br>377.019<br>14/ 7                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 54.455<br>128.457<br>27/11                | 45.825<br>745.670<br>12/ 7                |
|     | ONE YEAR<br>USE/PEAK                             | 763.978<br>251.666                        | 183.796<br>745.670                        |

EMC ENGINEERS INC. E2DOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 15:32:42 PDL RUN 1  
 DENVER, CO 80227 RUN #1 NIGHT SET BACK FOR BLDG.# 7656 GEN INST BLDG  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 9.08        | 183.80      |
| SPACE COOL      | 132.57      | 0.00        |
| HVAC AUX        | 368.04      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 203.97      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 50.32       | 0.00        |
| TOTAL           | 763.98      | 183.80      |

TOTAL SITE ENERGY 947.77 MBTU 83.8 KBTU/SQFT-YR GROSS-AREA 83.8 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2478.02 MBTU 219.0 KBTU/SQFT-YR GROSS-AREA 219.1 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 14.8  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.5  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITS/EQU  
 EQUIP-SCHEDULE = L\_LITS/EQU EQUIPMENT-W/SQFT = 0.37  
 FURN-FRACTION = 0.3 FURN-WEIGHT = 1.  
 INF-METHOD = NONE ..

E-W HEIGHT = 18.0 WIDTH = 39.0 CONS = EXWALL-1  
 AZIMUTH = 0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.0 WIDTH = 4.0 G-T = 2\_PN\_STD  
 SETBACK = 0.3 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 12.0 WIDTH = 84.0 CONS = EXWALL-1  
 AZIMUTH = 0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 8.0 WIDTH = 4.0 G-T = 2\_PN\_STD  
 MULTIPLIER = 18.0 SETBACK = 0.3  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
 SETBACK = 0.3 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 15.0 WIDTH = 108.0 CONS = FLOOR ..

ROOF HEIGHT = 15.0 WIDTH = 31.5 CONS = R-MEZZIN  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

ROOF HEIGHT = 15.0 WIDTH = 76.5 CONS = ROOF-DIN  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #2 DDC CONTROL FOR BLDG.# 7656 \*

LINE-5 \*GEN INST BLDG \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)

SUMMARY=(SS-A,SS-B,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE (1,24) (1.) ..
SD_SM_CL_W =DAY-SCHEDULE (1,24) (76.) ..
SD_WT_HT_W =DAY-SCHEDULE (1,24) (70.) ..
SD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
SD_SM_HT_W =DAY-SCHEDULE (1,24) (75.8) ..
SD_WT_CL_W =DAY-SCHEDULE (1,24) (70.2) ..
SD_OA%     =DAY-SCHEDULE (1,24) (0.1) ..
SD_WT_HT_F =DAY-SCHEDULE (1,24) (74.) ..
SD_SM_CL_F =DAY-SCHEDULE (1,24) (72.) ..
SD_SM_HT_F =DAY-SCHEDULE (1,24) (71.8) ..
SD_WT_CL_F =DAY-SCHEDULE (1,13) (74.2)
              (14) (74.27)
              (15,24) (74.2) ..
SD_SM_HT_D =DAY-SCHEDULE (1,24) (71.8) ..
SD_WT_CL_D =DAY-SCHEDULE (1,13) (74.2)
              (14) (74.27)
              (15,24) (74.2) ..
SD_WT_HT_D =DAY-SCHEDULE (1,24) (74.) ..
SD_SM_CL_D =DAY-SCHEDULE (1,24) (72.) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..

SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..

SW_WT_HT   =WEEK-SCHEDULE (ALL) SD_WT_HT_W ..

SW_SM_CL   =WEEK-SCHEDULE (ALL) SD_SM_CL_W ..

SW_SM_HT   =WEEK-SCHEDULE (ALL) SD_SM_HT_W ..

SW_WT_CL   =WEEK-SCHEDULE (ALL) SD_WT_CL_W ..

SW_OA%     =WEEK-SCHEDULE (ALL) SD_OA% ..

S_FULL_ON  =SCHEDULE THRU DEC 31 SW_ON ..

S_FULL_OFF =SCHEDULE THRU DEC 31 SW_OFF ..

$ HEATING SEASON
S_HE_SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT 1 SW_OFF
              THRU DEC 31 SW_ON ..

$ COOLING SEASON
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT 1 SW_ON
              THRU DEC 31 SW_OFF ..

$ HEATING SET TEMP
S_HT_SET_F =SCHEDULE THRU MAY 15 SW_WT_HT

```



THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
THRU JAN 15 SW\_ON  
THRU AUG 22 SW\_OFF  
THRU AUG 23 SW\_ON  
THRU DEC 31 SW\_OFF ..

## \$ ZONE DESCRIPTION

S-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

W-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

E-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

CORE\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

N-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

MZ-SYSTEM =SYSTEM SYSTEM-TYPE = MZS  
MAX-SUPPLY-T = 120.0 MIN-SUPPLY-T = 55.0  
HEATING-SCHEDULE = S\_HE\_SCHED

```

COOLING-SCHEDULE = S_CL_SCHED  PREHEAT-T = 0.0
HEAT-CONTROL = COLDEST  COOL-CONTROL = WARMEST
OA-CONTROL = FIXED  SUPPLY-CFM = 14000.
RATED-CFM = 14000.  MIN-OUTSIDE-AIR = 0.1
MIN-AIR-SCH = S_OA%  MAX-OA-FRACTION = 0.1
SUPPLY-DELTA-T = 2.7  SUPPLY-KW = 0.00088
MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
NIGHT-CYCLE-CTRL = STAY-OFF  NIGHT-VENT-DT = 0.0
MIN-CFM-RATIO = 1.0  COOLING-CAPACITY = 402500.
COOL-SH-CAP = 362250.  HEATING-CAPACITY = -1225000.
SIZING-OPTION = COINCIDENT  RETURN-AIR-PATH = DUCT
ZONE-NAMES = (S-PER_ZONE, N-PER_ZONE, W-PER_ZONE,
              E-PER_ZONE, CORE_ZONE) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

AHU-BLOCK  =REPORT-BLOCK VARIABLE-TYPE = MZ-SYSTEM
              VARIABLE-LIST = (3,5,6,18,18,17) ..
ZONE-N-BLK  =REPORT-BLOCK VARIABLE-TYPE = N-PER_ZONE
              VARIABLE-LIST = (17,18,7,31) ..
ZONE-S-BLK  =REPORT-BLOCK VARIABLE-TYPE = S-PER_ZONE
              VARIABLE-LIST = (17,18,7,31) ..
HRLY-ZN-N   = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
              REPORT-BLOCK = (ZONE-N-BLK)
..
HRLY-ZN-S   = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
              REPORT-BLOCK = (ZONE-S-BLK)
..
HRLY-AHU    = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
              REPORT-BLOCK = (AHU-BLOCK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #2 DDC CONTROL FOR BLDG.# 7656      *
        LINE-5 *GEN INST BLDG                        * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC  WARNINGS ..
PLANT-REPORT  VERIFICATION=(PV-A)
                SUMMARY=(PS-B,BEPS)
                HOURLY-DATA-SAVE = YES ..

```

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 14:26:51 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG.# 7656 GEN INST BLDG  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-SYSTEM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |   |                           |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | -40.297                     | 15                      | -6.F                 | -7.F                 | 0.000                                   | -201.276                                | 15412.                    | 33.457                          |
| FEB   | 0.00000                     |                         |                      |                      | -22.106                     | 3                       | -1.F                 | -2.F                 | 0.000                                   | -151.352                                | 13870.                    | 33.457                          |
| MAR   | 0.00000                     |                         |                      |                      | -9.938                      | 14                      | 15.F                 | 13.F                 | 0.000                                   | -117.613                                | 16067.                    | 33.457                          |
| APR   | 0.00000                     |                         |                      |                      | -1.381                      | 5                       | 37.F                 | 32.F                 | 0.000                                   | -14.791                                 | 14958.                    | 33.457                          |
| MAY   | 41.12622                    | 16                      | 62.F                 | 59.F                 | -0.682                      | 10                      | 60.F                 | 56.F                 | 416.303                                 | -13.373                                 | 15412.                    | 33.457                          |
| JUN   | 94.90955                    | 27                      | 89.F                 | 77.F                 | 0.000                       |                         |                      |                      | 291.687                                 | 0.000                                   | 15444.                    | 33.457                          |
| JUL   | 110.49636                   | 13                      | 89.F                 | 79.F                 | 0.000                       |                         |                      |                      | 312.273                                 | 0.000                                   | 14926.                    | 33.457                          |
| AUG   | 114.16965                   | 24                      | 95.F                 | 77.F                 | 0.000                       |                         |                      |                      | 312.009                                 | 0.000                                   | 14958.                    | 33.457                          |
| SEP   | 69.53050                    | 7                       | 92.F                 | 75.F                 | 0.000                       |                         |                      |                      | 303.175                                 | 0.000                                   | 15084.                    | 33.457                          |
| OCT   | 0.83652                     | 1                       | 85.F                 | 68.F                 | -1.521                      | 19                      | 32.F                 | 29.F                 | 103.625                                 | -14.921                                 | 14947.                    | 33.457                          |
| NOV   | 0.00000                     |                         |                      |                      | -6.626                      | 13                      | 25.F                 | 24.F                 | 0.000                                   | -86.719                                 | 15254.                    | 33.457                          |
| DEC   | 0.00000                     |                         |                      |                      | -32.000                     | 12                      | 3.F                  | 2.F                  | 0.000                                   | -167.004                                |                           |                                 |
| TOTAL | 431.069                     |                         |                      |                      | -114.551                    |                         |                      |                      | 416.303                                 | -201.276                                | 182382.                   | 33.457                          |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   |   |                           |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 14:26:51 SDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG.# 7656 GEN INST BLDG  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-SYSTEM TOPEKA, KS

| MONTH  | HOURS           |                 |                                 |          | HOURS             |                   |         |                  | HOURS               |                           |                             |                                       | COINCIDENT LOADS                      |  |                 |  |
|--------|-----------------|-----------------|---------------------------------|----------|-------------------|-------------------|---------|------------------|---------------------|---------------------------|-----------------------------|---------------------------------------|---------------------------------------|--|-----------------|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COINCIDENT<br>COOL-HEAT<br>LOAD | FLOATING | HEATING<br>AVAIL. | COOLING<br>AVAIL. | FANS ON | FANS ON<br>CYCLE | HOURS<br>FANS<br>ON | HOURS<br>NIGHT<br>VENTING | FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK | HEATING<br>LOAD AT<br>COOLING<br>PEAK | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK | COOLING<br>PEAK | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK |
| JAN    | 0               | 678             | 0                               | 66       | 744               | 0                 | 744     | 0                | 0                   | 0                         | 66                          | -7.188                                | -7.188                                | 12.320                                 | 12.320          | 12.320                                 |
| FEB    | 0               | 597             | 0                               | 75       | 672               | 0                 | 672     | 0                | 0                   | 0                         | 75                          | -6.182                                | -6.182                                | 12.320                                 | 12.320          | 12.320                                 |
| MAR    | 0               | 516             | 0                               | 228      | 744               | 0                 | 744     | 0                | 0                   | 0                         | 228                         | -6.226                                | -6.226                                | 12.320                                 | 12.320          | 12.320                                 |
| APR    | 0               | 374             | 0                               | 346      | 720               | 0                 | 720     | 0                | 0                   | 0                         | 346                         | -5.298                                | -5.298                                | 12.320                                 | 12.320          | 12.320                                 |
| MAY    | 382             | 189             | 0                               | 173      | 360               | 384               | 744     | 0                | 0                   | 0                         | 173                         | 0.000                                 | 0.000                                 | 12.320                                 | 12.320          | 12.320                                 |
| JUN    | 711             | 0               | 0                               | 9        | 0                 | 720               | 744     | 0                | 0                   | 0                         | 9                           | 0.000                                 | 0.000                                 | 33.457                                 | 33.457          | 33.457                                 |
| JUL    | 744             | 0               | 0                               | 0        | 0                 | 744               | 744     | 0                | 0                   | 0                         | 0                           | 0.000                                 | 0.000                                 | 33.457                                 | 33.457          | 33.457                                 |
| AUG    | 744             | 0               | 0                               | 0        | 0                 | 744               | 744     | 0                | 0                   | 0                         | 0                           | 0.000                                 | 0.000                                 | 33.457                                 | 33.457          | 33.457                                 |
| SEP    | 635             | 0               | 0                               | 85       | 720               | 720               | 744     | 0                | 0                   | 0                         | 85                          | 0.000                                 | 0.000                                 | 12.320                                 | 12.320          | 12.320                                 |
| OCT    | 15              | 417             | 0                               | 312      | 720               | 24                | 744     | 0                | 0                   | 0                         | 312                         | -15.541                               | -15.541                               | 12.320                                 | 12.320          | 12.320                                 |
| NOV    | 0               | 509             | 0                               | 211      | 720               | 0                 | 744     | 0                | 0                   | 0                         | 211                         | -99.199                               | -99.199                               | 12.320                                 | 12.320          | 12.320                                 |
| DEC    | 0               | 670             | 0                               | 74       | 744               | 0                 | 744     | 0                | 0                   | 0                         | 74                          |                                       |                                       |  |                 |  |
| ANNUAL | 3231            | 3950            | 0                               | 1579     | 5424              | 3336              | 8760    | 0                | 0                   | 0                         | 1579                        |                                       |                                       |  |                 |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 14:26:51 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG.# 7656 GEN INST BLDG  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>55.058<br>119.074<br>28/11 | NATURAL-GAS<br>59.809<br>253.691<br>15/ 8 |
|-----|--|---|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 49.087<br>119.074<br>28/ 8                | 35.007<br>200.174<br>3/ 6                 |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 55.815<br>119.074<br>14/ 8                | 16.675<br>162.628<br>14/ 6                |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 51.389<br>115.073<br>5/22                 | 3.281<br>26.910<br>5/23                   |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 69.257<br>225.344<br>31/18                | 1.632<br>24.593<br>10/23                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 89.919<br>225.660<br>28/17                | 0.000<br>0.000<br>30/ 1                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 94.144<br>231.947<br>13/17                | 0.000<br>0.000<br>31/ 1                   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 100.745<br>236.560<br>24/17               | 0.000<br>0.000<br>31/ 1                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 79.510<br>231.542<br>7/16                 | 0.000<br>0.000<br>30/ 1                   |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.319<br>115.221<br>26/19                | 3.628<br>27.123<br>19/23                  |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 51.841<br>117.540<br>3/ 8                 | 12.000<br>127.272<br>13/ 6                |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 54.306<br>119.074<br>30/ 8                | 49.151<br>217.215<br>12/ 6                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 803.390<br>236.560                        | 181.183<br>253.691                        |
|     | ONE YEAR<br>USE/PEAK                             |   |   |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 14:26:51 PDL RUN 1  
 DENVER, CO 80227 RUN #2 DDC CONTROL FOR BLDG. # 7656 GEN INST BLDG  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE     | ELECTRICITY | NATURAL-GAS |
|-----------------|-------------|-------------|
| IN SITE MBTU -  |             |             |
| CATEGORY OF USE |             |             |
| SPACE HEAT      | 7.50        | 181.18      |
| SPACE COOL      | 156.66      | 0.00        |
| HVAC AUX        | 384.94      | 0.00        |
| DOM HOT WTR     | 0.00        | 0.00        |
| AUX SOLAR       | 0.00        | 0.00        |
| LIGHTS          | 203.97      | 0.00        |
| VERT TRANS      | 0.00        | 0.00        |
| MISC EQUIP      | 50.32       | 0.00        |
| TOTAL           | 803.39      | 181.18      |

TOTAL SITE ENERGY 984.57 MBTU 87.0 KBTU/SQFT-YR GROSS-AREA 87.1 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2593.77 MBTU 229.3 KBTU/SQFT-YR GROSS-AREA 229.4 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 2.4  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.5  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITS/EQU  
 EQUIP-SCHEDULE = L\_LITS/EQU EQUIPMENT-W/SQFT = 0.37  
 FURN-FRACTION = 0.3 FURN-WEIGHT = 1.  
 INF-METHOD = NONE ..

E-W HEIGHT = 18.0 WIDTH = 39.0 CONS = EXWALL-1  
 AZIMUTH = 0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.0 WIDTH = 4.0 G-T = 2\_PN\_STD  
 SETBACK = 0.3 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 12.0 WIDTH = 84.0 CONS = EXWALL-1  
 AZIMUTH = 0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 8.0 WIDTH = 4.0 G-T = 2\_PN\_STD  
 MULTIPLIER = 18.0 SETBACK = 0.3  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
 SETBACK = 0.3 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 15.0 WIDTH = 108.0 CONS = FLOOR ..

ROOF HEIGHT = 15.0 WIDTH = 31.5 CONS = R-MEZZIN  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

ROOF HEIGHT = 15.0 WIDTH = 76.5 CONS = ROOF-DIN  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*  
 LINE-4 \*RUN #3 ECONOMIZER FOR BLDG.# 7656 \*  
 LINE-5 \*GEN INST BLDG \* ..  
 ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)

SUMMARY=(SS-A,SS-B,SS-C,SS-K,SS-O)

HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE  (1,24) (1.) ..
SD_SM_CL_W =DAY-SCHEDULE  (1,6) (85.)
                (7,22) (72.)
                (23,24) (85.) ..
SD_WT_HT_W =DAY-SCHEDULE  (1,6) (55.)
                (7,22) (74.)
                (23,24) (55.) ..
SD_OFF     =DAY-SCHEDULE  (1,24) (0.) ..
SD_SM_HT_W =DAY-SCHEDULE  (1,6) (83.)
                (7,22) (70.)
                (23,24) (83.) ..
SD_WT_CL_W =DAY-SCHEDULE  (1,6) (57.)
                (7,22) (76.)
                (23,24) (57.) ..
SD_OA%     =DAY-SCHEDULE  (1,24) (0.1) ..
SD_WT_HT_F =DAY-SCHEDULE  (1,6) (55.)
                (7,15) (74.)
                (16,24) (55.) ..
SD_SM_CL_F =DAY-SCHEDULE  (1,6) (85.)
                (7,15) (72.)
                (16,24) (85.) ..
SD_SM_HT_F =DAY-SCHEDULE  (1,6) (83.)
                (7,15) (70.)
                (16,24) (83.) ..
SD_WT_CL_F =DAY-SCHEDULE  (1,6) (57.)
                (7,15) (76.)
                (16,24) (57.) ..
SD_SM_HT_D =DAY-SCHEDULE  (1,24) (83.) ..
SD_WT_CL_D =DAY-SCHEDULE  (1,24) (57.) ..
SD_WT_HT_D =DAY-SCHEDULE  (1,24) (55.) ..
SD_SM_CL_D =DAY-SCHEDULE  (1,24) (85.) ..
SD_FAN_W   =DAY-SCHEDULE  (1,6) (0.)
                (7,22) (1.)
                (23,24) (0.) ..
SD_FAN_F   =DAY-SCHEDULE  (1,6) (0.)
                (7,15) (1.)
                (16,24) (0.) ..
SD_FAN_D   =DAY-SCHEDULE  (1,24) (0.) ..

SW_ON      =WEEK-SCHEDULE  (ALL) SD_ON ..

SW_OFF     =WEEK-SCHEDULE  (ALL) SD_OFF ..

SW_WT_HT   =WEEK-SCHEDULE  (MON) SD_WT_HT_W
                (TUE) SD_WT_HT_W
                (WED) SD_WT_HT_W
                (THU) SD_WT_HT_W
                (FRI) SD_WT_HT_F
                (SAT) SD_WT_HT_D
                (SUN) SD_WT_HT_D
                (HOL) SD_WT_HT_D ..

```



```

SW_SM_CL    =WEEK-SCHEDULE  (MON) SD_SM_CL_W
                               (TUE) SD_SM_CL_W
                               (WED) SD_SM_CL_W
                               (THU) SD_SM_CL_W
                               (FRI) SD_SM_CL_F
                               (SAT) SD_SM_CL_D
                               (SUN) SD_SM_CL_D
                               (HOL) SD_SM_CL_D ..

```

```

SW_SM_HT    =WEEK-SCHEDULE  (MON) SD_SM_HT_W
                               (TUE) SD_SM_HT_W
                               (WED) SD_SM_HT_W
                               (THU) SD_SM_HT_W
                               (FRI) SD_SM_HT_F
                               (SAT) SD_SM_HT_D
                               (SUN) SD_SM_HT_D
                               (HOL) SD_SM_HT_D ..

```

```

SW_WT_CL    =WEEK-SCHEDULE  (MON) SD_WT_CL_W
                               (TUE) SD_WT_CL_W
                               (WED) SD_WT_CL_W
                               (THU) SD_WT_CL_W
                               (FRI) SD_WT_CL_F
                               (SAT) SD_WT_CL_D
                               (SUN) SD_WT_CL_D
                               (HOL) SD_WT_CL_D ..

```

```

SW_OA%      =WEEK-SCHEDULE  (ALL) SD_OA% ..

```

```

SW_FAN      =WEEK-SCHEDULE  (MON) SD_FAN_W
                               (TUE) SD_FAN_W
                               (WED) SD_FAN_W
                               (THU) SD_FAN_W
                               (FRI) SD_FAN_F
                               (SAT) SD_FAN_D
                               (SUN) SD_FAN_D
                               (HOL) SD_FAN_D ..

```

```

S_FULL_ON   =SCHEDULE THRU DEC 31 SW_ON ..

```

```

S_FULL_OFF  =SCHEDULE THRU DEC 31 SW_OFF ..

```

# \$ HEATING SEASON

```

S_HE_SCHED  =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT  1 SW_OFF
              THRU DEC 31 SW_ON ..

```

# \$ COOLING SEASON

```

S_CL_SCHED  =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT  1 SW_ON
              THRU DEC 31 SW_OFF ..

```

# \$ HEATING SET TEMP

```

S_HT_SET_F  =SCHEDULE THRU MAY 15 SW_WT_HT

```

THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HRLY-RPT =SCHEDULE THRU JAN 12 SW\_OFF  
THRU JAN 15 SW\_ON  
THRU AUG 18 SW\_OFF  
THRU AUG 20 SW\_ON  
THRU AUG 22 SW\_OFF  
THRU AUG 23 SW\_ON  
THRU DEC 31 SW\_OFF ..

S\_FAN\_CYC =SCHEDULE THRU DEC 31 SW\_FAN ..

## \$ ZONE DESCRIPTION

S-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

W-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

E-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

CORE\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

N-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL  
SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

```

MZ-SYSTEM =SYSTEM      SYSTEM-TYPE = MZS
                        MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
                        HEATING-SCHEDULE = S_HE_SCHED
                        COOLING-SCHEDULE = S_CL_SCHED  PREHEAT-T = 0.0
                        ECONO-LIMIT-T = 70.0  HEAT-CONTROL = COLDEST ←
                        COOL-CONTROL = WARMEST  SUPPLY-CFM = 14000.
                        RATED-CFM = 14000.  MIN-OUTSIDE-AIR = 0.1
                        FAN-SCHEDULE = S_FAN_CYC  SUPPLY-DELTA-T = 2.7
                        SUPPLY-KW = 0.00088
                        MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
                        NIGHT-CYCLE-CTRL = CYCLE-ON-ANY  NIGHT-VENT-DT = 0.0
                        MIN-CFM-RATIO = 1.0  COOLING-CAPACITY = 402500.
                        COOL-SH-CAP = 362250.  HEATING-CAPACITY = -1225000.
                        SIZING-OPTION = COINCIDENT  RETURN-AIR-PATH = DUCT
                        ZONE-NAMES = (S-PER_ZONE, N-PER_ZONE, W-PER_ZONE,
                                      E-PER_ZONE, CORE_ZONE) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = MZ-SYSTEM
                        VARIABLE-LIST = (3,5,6,18,18,17) ..
ZONE-N-BLK =REPORT-BLOCK VARIABLE-TYPE = N-PER_ZONE
                        VARIABLE-LIST = (17,18,7,31) ..
ZONE-S-BLK =REPORT-BLOCK VARIABLE-TYPE = S-PER_ZONE
                        VARIABLE-LIST = (17,18,7,31) ..
HRLY-ZN-N = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                        REPORT-BLOCK = (ZONE-N-BLK)
..
HRLY-ZN-S = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                        REPORT-BLOCK = (ZONE-S-BLK)
..
HRLY-AHU = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                        REPORT-BLOCK = (AHU-BLOCK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #3 ECONOMIZER FOR BLDG.# 7656      *
        LINE-5 *GEN INST BLDG                        * ..

```

```

ABORT          ERRORS ..

```

| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 15:42:13 SDL RUN 1 |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |  |
|--|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|--|
| DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG.# 7656 GEN INST BLDG                               |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |  |
| REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-SYSTEM TOPEKA, KS                             |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |  |
| MONTH  | COOLING                     |                         |                      |                      | HEATING                     |                         |                      |                      | ELEC                                    |                           |                                 |  |
|  | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |  |
| JAN  | 0.00000                     |                         |                      |                      | -60.628                     | 17                      | 7                    | 27.F                 | 24.F                                    | 13687.                    | 33.457                          |  |
| FEB  | 0.00000                     |                         |                      |                      | -46.420                     | 28                      | 7                    | 14.F                 | 12.F                                    | 12428.                    | 33.457                          |  |
| MAR  | 0.00000                     |                         |                      |                      | -39.813                     | 14                      | 7                    | 16.F                 | 14.F                                    | 14934.                    | 33.457                          |  |
| APR  | 0.00000                     |                         |                      |                      | -16.760                     | 4                       | 7                    | 32.F                 | 30.F                                    | 14699.                    | 33.457                          |  |
| MAY  | 28.36173                    | 31                      | 7                    | 75.F                 | -4.464                      | 9                       | 7                    | 43.F                 | 43.F                                    | 15129.                    | 33.457                          |  |
| JUN  | 78.24092                    | 20                      | 7                    | 75.F                 | 0.000                       |                         |                      |                      |   | 14840.                    | 33.457                          |  |
| JUL  | 88.67802                    | 25                      | 7                    | 69.F                 | 0.000                       |                         |                      |                      |   | 13534.                    | 33.457                          |  |
| AUG  | 99.48522                    | 15                      | 7                    | 68.F                 | 0.000                       |                         |                      |                      |   | 15008.                    | 33.457                          |  |
| SEP  | 56.37944                    | 6                       | 7                    | 75.F                 | 0.000                       |                         |                      |                      |   | 14675.                    | 33.457                          |  |
| OCT  | 0.05201                     | 1                       | 17                   | 85.F                 | -15.255                     | 31                      | 7                    | 43.F                 | 39.F                                    | 14813.                    | 33.457                          |  |
| NOV  | 0.00000                     |                         |                      |                      | -33.655                     | 28                      | 7                    | 28.F                 | 26.F                                    | 13851.                    | 33.457                          |  |
| DEC  | 0.00000                     |                         |                      |                      | -57.997                     | 12                      | 7                    | 2.F                  | 1.F                                     | 13677.                    | 33.457                          |  |
| TOTAL  | 351.197                     |                         |                      |                      | -274.992                    |                         |                      |                      |   | 171260.                   | 33.457                          |  |
| MAX  |                             |                         |                      |                      |                             |                         |                      |                      |   |                           |                                 |  |
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| EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 15:42:13 SDL RUN 1 |                 |                          |                   |          |                            |                            |                              |                                      |  |  |
|--|-----------------|--------------------------|-------------------|----------|----------------------------|----------------------------|------------------------------|--------------------------------------|--|--|
| DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG.# 7656 GEN INST BLDG                               |                 |                          |                   |          |                            |                            |                              |                                      |  |  |
| REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-SYSTEM TOPEKA, KS                                |                 |                          |                   |          |                            |                            |                              |                                      |  |  |
| MONTH  | HOURS           |                          |                   |          | HOURS                      |                            |                              |                                      | --COINCIDENT LOADS--                               |  |
|  | COOLING<br>LOAD | HOURS<br>HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>FLOTTING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN  | 0               | 572                      | 0                 | 172      | 744                        | 0                          | 604                          | 296                                  | 0.000  | 12.320   |
| FEB  | 0               | 512                      | 0                 | 160      | 672                        | 0                          | 555                          | 279                                  | 0.000  | 12.320   |
| MAR  | 0               | 533                      | 0                 | 211      | 744                        | 0                          | 652                          | 312                                  | 0.000  | 12.320   |
| APR  | 0               | 304                      | 0                 | 416      | 720                        | 0                          | 699                          | 398                                  | 0.000  | 12.320   |
| MAY  | 212             | 126                      | 0                 | 406      | 360                        | 384                        | 721                          | 413                                  | 0.000  | 22.888   |
| JUN  | 454             | 0                        | 0                 | 266      | 0                          | 720                        | 671                          | 347                                  | 0.000  | 22.888   |
| JUL  | 473             | 0                        | 0                 | 271      | 0                          | 744                        | 631                          | 346                                  | 0.000  | 22.888   |
| AUG  | 506             | 0                        | 0                 | 238      | 0                          | 744                        | 658                          | 318                                  | 0.000  | 22.888   |
| SEP  | 330             | 0                        | 0                 | 390      | 0                          | 720                        | 697                          | 396                                  | 0.000  | 22.888   |
| OCT  | 5               | 293                      | 0                 | 446      | 720                        | 24                         | 722                          | 430                                  | 0.000  | 12.320   |
| NOV  | 0               | 487                      | 0                 | 233      | 720                        | 0                          | 631                          | 332                                  | 0.000  | 12.320   |
| DEC  | 0               | 586                      | 0                 | 158      | 744                        | 0                          | 616                          | 315                                  | -62.559  | 12.320   |
| ANNUAL 1980  |                 | 3413                     | 0                 | 3367     | 5424                       | 3336                       | 7857                         | 4182                                 |  |  |
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EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 15:42:13 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG.# 7656 GEN INST BLDG  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>52.131<br>130.348<br>31/11 | NATURAL-GAS<br>99.344<br>760.081<br>17/ 7 |
|-----|--|---|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.131<br>130.348<br>31/11                | 99.344<br>760.081<br>17/ 7                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 46.713<br>130.348<br>28/11                | 76.815<br>830.242<br>28/ 7                |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 54.853<br>130.348<br>31/ 8                | 66.918<br>773.887<br>14/ 7                |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.006<br>130.348<br>25/ 8                | 29.193<br>603.149<br>4/ 7                 |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 63.498<br>249.095<br>31/18                | 8.197<br>560.717<br>9/ 7                  |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 81.345<br>250.101<br>27/17                | 0.000<br>0.000<br>30/ 1                   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 80.890<br>247.989<br>13/17                | 0.000<br>0.000<br>31/ 1                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 91.527<br>264.051<br>22/16                | 0.000<br>0.000<br>31/ 1                   |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 71.837<br>258.145<br>6/16                 | 0.000<br>0.000<br>30/ 1                   |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.331<br>130.348<br>31/10                | 26.653<br>644.574<br>31/ 7                |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 50.676<br>130.348<br>30/ 9                | 57.200<br>701.804<br>28/ 7                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 51.941<br>130.348<br>30/10                | 95.454<br>844.805<br>12/ 7                |
|     | ONE YEAR<br>USE/PEAK                             | 749.748<br>264.051                        | 459.774<br>844.805                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 15:42:13 PDL RUN 1  
 DENVER, CO 80227 RUN #3 ECONOMIZER FOR BLDG.# 7656 GEN INST BLDG  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 21.97       | 459.77      |
| SPACE COOL                                       | 127.11      | 0.00        |
| HVAC AUX   | 346.39      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 203.97      | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 50.32       | 0.00        |
| TOTAL  | 749.76      | 459.77      |

TOTAL SITE ENERGY 1209.52 MBTU 106.9 KBTU/SQFT-YR GROSS-AREA 107.0 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2711.27 MBTU 239.6 KBTU/SQFT-YR GROSS-AREA 239.8 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 15.7  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.5  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITS/EQU  
 EQUIP-SCHEDULE = L\_LITS/EQU EQUIPMENT-W/SQFT = 0.37  
 FURN-FRACTION = 0.3 FURN-WEIGHT = 1.  
 INF-METHOD = NONE ..

E-W HEIGHT = 18.0 WIDTH = 39.0 CONS = EXWALL-1  
 AZIMUTH = 0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.0 WIDTH = 4.0 G-T = 2\_PN\_STD  
 SETBACK = 0.3 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 12.0 WIDTH = 84.0 CONS = EXWALL-1  
 AZIMUTH = 0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 8.0 WIDTH = 4.0 G-T = 2\_PN\_STD  
 MULTIPLIER = 18.0 SETBACK = 0.3  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
 SETBACK = 0.3 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 15.0 WIDTH = 108.0 CONS = FLOOR ..

ROOF HEIGHT = 15.0 WIDTH = 31.5 CONS = R-MEZZIN  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

ROOF HEIGHT = 15.0 WIDTH = 76.5 CONS = ROOF-DIN  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #4 NIGHT INFILTRATION BLDG.# 7656 \*  
 LINE-5 \*GEN INST BLDG \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)

SUMMARY=(SS-A,SS-B,SS-C,SS-K,SS-O)

HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE (1,24) (1.) ..
SD_SM_CL   =DAY-SCHEDULE (1,24) (72.) ..
SD_WT_HT   =DAY-SCHEDULE (1,24) (74.) ..
SD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
SD_SM_HT   =DAY-SCHEDULE (1,24) (71.8) ..
SD_WT_CL   =DAY-SCHEDULE (1,13) (74.2)
              (14) (74.27)
              (15,24) (74.2) ..
SD_OA%_W   =DAY-SCHEDULE (1,6) (0.)
              (7,22) (0.1)
              (23,24) (0.) ..
SD_OA%_F   =DAY-SCHEDULE (1,6) (0.)
              (7,15) (0.1)
              (16,24) (0.) ..
SD_OA%_D   =DAY-SCHEDULE (1,24) (0.) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..
SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..
SW_WT_HT   =WEEK-SCHEDULE (ALL) SD_WT_HT ..
SW_SM_CL   =WEEK-SCHEDULE (ALL) SD_SM_CL ..
SW_SM_HT   =WEEK-SCHEDULE (ALL) SD_SM_HT ..
SW_WT_CL   =WEEK-SCHEDULE (ALL) SD_WT_CL ..

SW_OA%     =WEEK-SCHEDULE (MON) SD_OA%_W
              (TUE) SD_OA%_W
              (WED) SD_OA%_W
              (THU) SD_OA%_W
              (FRI) SD_OA%_F
              (SAT) SD_OA%_D
              (SUN) SD_OA%_D
              (HOL) SD_OA%_D ..

S_FULL_ON  =SCHEDULE THRU DEC 31 SW_ON ..
S_FULL_OFF =SCHEDULE THRU DEC 31 SW_OFF ..

$ HEATING SEASON
S_HE_SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT 1 SW_OFF
              THRU DEC 31 SW_ON ..

$ COOLING SEASON
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT 1 SW_ON
              THRU DEC 31 SW_OFF ..

```





## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
THRU JAN 15 SW\_ON  
THRU AUG 22 SW\_OFF  
THRU AUG 23 SW\_ON  
THRU DEC 31 SW\_OFF ..

## \$ ZONE DESCRIPTION

S-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

W-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

E-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

CORE\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

N-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

```

MZ-SYSTEM =SYSTEM      SYSTEM-TYPE = MZS
                        MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
                        HEATING-SCHEDULE = S_HE_SCHD
                        COOLING-SCHEDULE = S_CL_SCHD  PREHEAT-T = 0.0
                        OA-CONTROL = FIXED  SUPPLY-CFM = 14000.
                        RATED-CFM = 14000.  MIN-AIR-SCH = S_OA% ←
                        MAX-OA-FRACTION = 0.1  SUPPLY-DELTA-T = 2.7
                        SUPPLY-KW = 0.00088
                        MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
                        NIGHT-CYCLE-CTRL = STAY-OFF  NIGHT-VENT-DT = 0.0
                        MIN-CFM-RATIO = 1.0  COOLING-CAPACITY = 402500.
                        COOL-SH-CAP = 362250.  HEATING-CAPACITY = -1225000.
                        SIZING-OPTION = COINCIDENT  RETURN-AIR-PATH = DUCT
                        ZONE-NAMES = (S-PER_ZONE, N-PER_ZONE, W-PER_ZONE,
                                      E-PER_ZONE, CORE_ZONE) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = MZ-SYSTEM
                        VARIABLE-LIST = (3,5,6,18,18,17) ..
ZONE-N-BLK =REPORT-BLOCK VARIABLE-TYPE = N-PER_ZONE
                        VARIABLE-LIST = (17,18,7,31) ..
ZONE-S-BLK =REPORT-BLOCK VARIABLE-TYPE = S-PER_ZONE
                        VARIABLE-LIST = (17,18,7,31) ..
HRLY-ZN-N  = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                        REPORT-BLOCK = (ZONE-N-BLK)
..
HRLY-ZN-S  = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                        REPORT-BLOCK = (ZONE-S-BLK)
..
HRLY-AHU   = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                        REPORT-BLOCK = (AHU-BLOCK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
      LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
      LINE-3 *      DENVER,      CO      80227      *

      LINE-4 *RUN #4 NIGHT INFILTRATION BLDG.# 7656      *
      LINE-5 *GEN INST BLDG                                * ..

```

```

ABORT      ERRORS ..
DIAGNOSTIC WARNINGS ..
PLANT-REPORT  VERIFICATION=(PV-A)

```

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 16: 7:20 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION BLDG.# 7656 GEN INST BLDG  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-SYSTEM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | MAXIMUM<br>COOLING<br>LOAD<br>(KBTU/HR) | H E A T I N G               |                         |                      |                      | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | E L E C                   |                                 |
|-------|-----------------------------|-------------------------|----------------------|----------------------|---|-----------------------------|-------------------------|----------------------|----------------------|---|---------------------------|---------------------------------|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP |   | TRICAL<br>ENERGY<br>(KWH) | MAXIMUM<br>ELEC<br>LOAD<br>(KW) |
| JAN   | 0.00000                     |                         |                      |                      | 0.000                                   | -18.525                     | 28                      | 7                    | -3. F                | -147.161                                | 15412.                    | 33.457                          |
| FEB   | 0.00000                     |                         |                      |                      | 0.000                                   | -7.299                      | 3                       | 7                    | -6. F                | -133.682                                | 13870.                    | 33.457                          |
| MAR   | 0.00000                     |                         |                      |                      | 0.000                                   | -2.156                      | 3                       | 8                    | 12. F                | -58.935                                 | 16067.                    | 33.457                          |
| APR   | 0.00000                     |                         |                      |                      | 0.000                                   | -1.068                      | 15                      | 7                    | 28. F                | -21.242                                 | 14958.                    | 33.457                          |
| MAY   | 48.76165                    | 16                      | 2                    | 62. F                | 59. F                                   | -0.535                      | 11                      | 7                    | 49. F                | -17.334                                 | 15412.                    | 33.457                          |
| JUN   | 97.44159                    | 27                      | 17                   | 89. F                | 77. F                                   | 0.000                       |                         |                      |                      | 0.000                                   | 15444.                    | 33.457                          |
| JUL   | 105.17020                   | 13                      | 19                   | 89. F                | 79. F                                   | 0.000                       |                         |                      |                      | 0.000                                   | 14926.                    | 33.457                          |
| AUG   | 112.84464                   | 24                      | 17                   | 95. F                | 77. F                                   | 0.000                       |                         |                      |                      | 0.000                                   | 16067.                    | 33.457                          |
| SEP   | 79.91335                    | 7                       | 17                   | 92. F                | 75. F                                   | 0.000                       |                         |                      |                      | 0.000                                   | 14958.                    | 33.457                          |
| OCT   | 1.29022                     | 1                       | 17                   | 85. F                | 68. F                                   | -1.288                      | 2                       | 2                    | 64. F                | -32.181                                 | 15084.                    | 33.457                          |
| NOV   | 0.00000                     |                         |                      |                      | 0.000                                   | -1.320                      | 2                       | 7                    | 19. F                | -22.443                                 | 14947.                    | 33.457                          |
| DEC   | 0.00000                     |                         |                      |                      | 0.000                                   | -14.232                     | 12                      | 7                    | 2. F                 | -157.929                                | 15254.                    | 33.457                          |
| TOTAL | 445.422                     |                         |                      |                      | 535.740                                 | -46.424                     |                         |                      |                      | -157.929                                | 182382.                   | 33.457                          |
| MAX   |                             |                         |                      |                      |   |                             |                         |                      |                      |   |                           |                                 |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 16: 7:20 SDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION BLDG.# 7656 GEN INST BLDG  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-SYSTEM TOPEKA, KS

| MONTH  | HOURS           |                 |                                 |          | N U M B E R                |                            |                            |                     | H O U R S                 |                                      |  |  | --COINCIDENT LOADS--                               |  |  |  |
|--------|-----------------|-----------------|---------------------------------|----------|----------------------------|----------------------------|----------------------------|---------------------|---------------------------|--------------------------------------|--|--|--|--|--|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COINCIDENT<br>COOL-HEAT<br>LOAD | FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | HOURS<br>FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |
| JAN    | 0               | 744             | 0                               | 0        | 744                        | 744                        | 0                          | 0                   | 0                         | 0                                    | -1.648   | 12.320   | -1.648   | 12.320   | -1.648   | 12.320   |
| FEB    | 0               | 672             | 0                               | 0        | 672                        | 672                        | 0                          | 0                   | 0                         | 0                                    | -0.832   | 12.320   | -0.832   | 12.320   | -0.832   | 12.320   |
| MAR    | 0               | 744             | 0                               | 0        | 744                        | 744                        | 0                          | 0                   | 0                         | 0                                    | -0.694   | 12.320   | -0.694   | 12.320   | -0.694   | 12.320   |
| APR    | 0               | 720             | 0                               | 0        | 720                        | 720                        | 0                          | 0                   | 0                         | 0                                    | -3.292   | 12.320   | -3.292   | 12.320   | -3.292   | 12.320   |
| MAY    | 384             | 358             | 0                               | 2        | 360                        | 744                        | 384                        | 0                   | 0                         | 2                                    | 0.000  | 12.320   | 0.000  | 12.320   | 0.000  | 12.320   |
| JUN    | 720             | 0               | 0                               | 0        | 0                          | 720                        | 720                        | 0                   | 0                         | 0                                    | 0.000  | 33.457   | 0.000  | 33.457   | 0.000  | 33.457   |
| JUL    | 744             | 0               | 0                               | 0        | 0                          | 744                        | 744                        | 0                   | 0                         | 0                                    | 0.000  | 33.457   | 0.000  | 33.457   | 0.000  | 33.457   |
| AUG    | 744             | 0               | 0                               | 0        | 0                          | 744                        | 744                        | 0                   | 0                         | 0                                    | 0.000  | 33.457   | 0.000  | 33.457   | 0.000  | 33.457   |
| SEP    | 716             | 0               | 0                               | 4        | 0                          | 720                        | 720                        | 0                   | 0                         | 4                                    | 0.000  | 12.320   | 0.000  | 12.320   | 0.000  | 12.320   |
| OCT    | 24              | 720             | 0                               | 0        | 720                        | 744                        | 24                         | 0                   | 0                         | 0                                    | -0.192   | 12.320   | -0.192   | 12.320   | -0.192   | 12.320   |
| NOV    | 0               | 720             | 0                               | 0        | 720                        | 744                        | 0                          | 0                   | 0                         | 0                                    | -37.952  | 12.320   | -37.952  | 12.320   | -37.952  | 12.320   |
| DEC    | 0               | 744             | 0                               | 0        | 744                        | 744                        | 0                          | 0                   | 0                         | 0                                    |  |  |  |  |  |  |
| ANNUAL | 3332            | 5422            | 0                               | 6        | 5424                       | 8760                       | 3336                       | 0                   | 0                         | 6                                    |  |  |  |  |  |  |

EMC ENGINEERS INC. 80227 EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 16: 7:20 PDL RUN 1  
 DENVER, CO MONTHLY PEAK AND TOTAL ENERGY USE RUN #4 NIGHT INFILTRATION BLDG.# 7656 GEN INST BLDG  
 REPORT- PS-B TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>54.114<br>118.032<br>31/ 8<br>48.189<br>118.032<br>28/ 8<br>55.349<br>118.032<br>4/ 8<br>51.461<br>115.030<br>5/22<br>73.272<br>241.117<br>16/16<br>94.318<br>241.723<br>28/17<br>95.939<br>248.509<br>13/17<br>104.101<br>253.222<br>24/17<br>86.596<br>247.773<br>7/16<br>52.706<br>115.179<br>26/20<br>51.447<br>115.521<br>10/ 8<br>53.352<br>118.032<br>30/14 | NATURAL-GAS<br>29.518<br>187.704<br>28/ 7<br>12.920<br>173.290<br>3/ 7<br>5.097<br>89.249<br>3/ 8<br>3.293<br>36.862<br>15/ 7<br>1.644<br>30.477<br>11/ 7<br>0.000<br>0.000<br>30/ 1<br>0.000<br>0.000<br>31/ 1<br>0.000<br>0.000<br>31/ 1<br>0.000<br>30/ 1<br>3.653<br>54.739<br>2/ 2<br>3.706<br>38.824<br>2/ 7<br>23.342<br>199.056<br>12/ 7 |
|-----|--|---|--|
| JAN |  |   |  |
| FEB |  |   |  |
| MAR |  |   |  |
| APR |  |   |  |
| MAY |  |   |  |
| JUN |  |   |  |
| JUL |  |   |  |
| AUG |  |   |  |
| SEP |  |   |  |
| OCT |  |   |  |
| NOV |  |   |  |
| DEC |  |   |  |
|     | ONE YEAR<br>USE/PEAK                             | 820.844<br>253.222  | 83.173<br>199.056  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 16: 7:20 PDL RUN 1  
 DENVER, CO 80227 RUN #4 NIGHT INFILTRATION BLDG.# 7656 GEN INST BLDG  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE | ELECTRICITY | NATURAL-GAS |
|--|-------------|-------------|
| SPACE HEAT                                       | 3.89        | 83.17       |
| SPACE COOL                                       | 172.72      | 0.00        |
| HVAC AUX   | 389.95      | 0.00        |
| DOM HOT WTR                                      | 0.00        | 0.00        |
| AUX SOLAR  | 0.00        | 0.00        |
| LIGHTS   | 203.97      | 0.00        |
| VERT TRANS                                       | 0.00        | 0.00        |
| MISC EQUIP                                       | 50.32       | 0.00        |
| TOTAL  | 820.85      | 83.17       |

TOTAL SITE ENERGY 904.02 MBTU 79.9 KBTU/SQFT-YR GROSS-AREA 79.9 KBTU/SQFT-YR NET-AREA  
 TOTAL SOURCE ENERGY 2548.17 MBTU 225.2 KBTU/SQFT-YR GROSS-AREA 225.3 KBTU/SQFT-YR NET-AREA  
 PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.4  
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0  
 NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED  
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



LIGHTING-TYPE = SUS-FLUOR LIGHTING-W/SQFT = 1.5  
 LIGHT-TO-SPACE = 1.0 LIGHTING-SCHEDULE = L\_LITS/EQU  
 EQUIP-SCHEDULE = L\_LITS/EQU EQUIPMENT-W/SQFT = 0.37  
 FURN-FRACTION = 0.3 FURN-WEIGHT = 1.  
 INF-METHOD = NONE ..

E-W HEIGHT = 18.0 WIDTH = 39.0 CONS = EXWALL-1  
 AZIMUTH = 0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 4.0 WIDTH = 4.0 G-T = 2\_PN\_STD  
 SETBACK = 0.3 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

E-W HEIGHT = 12.0 WIDTH = 84.0 CONS = EXWALL-1  
 AZIMUTH = 0 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

WINDOW HEIGHT = 8.0 WIDTH = 4.0 G-T = 2\_PN\_STD  
 MULTIPLIER = 18.0 SETBACK = 0.3  
 SKY-FORM-FACTOR = 0.5 GND-FORM-FACTOR = 0.5 ..

DOOR HEIGHT = 7.5 WIDTH = 3.5 CONS = DOOR-MET  
 SETBACK = 0.3 SKY-FORM-FACTOR = 0.5  
 GND-FORM-FACTOR = 0.5 ..

U-W HEIGHT = 15.0 WIDTH = 108.0 CONS = FLOOR ..

ROOF HEIGHT = 15.0 WIDTH = 31.5 CONS = R-MEZZIN  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

ROOF HEIGHT = 15.0 WIDTH = 76.5 CONS = ROOF-DIN  
 TILT = 0 SKY-FORM-FACTOR = 1.0 ..

END ..

COMPUTE LOADS ..

INPUT SYSTEMS ..

\$-----\$  
 \$ E Z - D O E S Y S T E M S I N P U T \$  
 \$-----\$

# \$ GENERAL PROJECT DATA

TITLE LINE-1 \* EMC ENGINEERS INC. \*  
 LINE-2 \*EZDOE - ELITE SOFTWARE DEVELOPMENT INC\*  
 LINE-3 \* DENVER, CO 80227 \*

LINE-4 \*RUN #5 DAY INFILTRATION FOR BLDG.# 7656 \*

LINE-5 \*GEN INST BLDG \* ..

ABORT ERRORS ..  
 DIAGNOSTIC WARNINGS ..  
 SYSTEMS-REPORT VERIFICATION=(SV-A)

SUMMARY=(SS-A,SS-B,SS-C,SS-K,SS-O)  
 HOURLY-DATA-SAVE = YES ..

## \$ SCHEDULES

```

SD_ON      =DAY-SCHEDULE (1,24) (1.) ..
SD_SM_CL   =DAY-SCHEDULE (1,24) (72.) ..
SD_WT_HT   =DAY-SCHEDULE (1,24) (74.) ..
SD_OFF     =DAY-SCHEDULE (1,24) (0.) ..
SD_SM_HT   =DAY-SCHEDULE (1,24) (71.8) ..
SD_WT_CL   =DAY-SCHEDULE (1,13) (74.2)
              (14) (74.27)
              (15,24) (74.2) ..
SD_OA%_W   =DAY-SCHEDULE (1,6) (0.1)
              (7,22) (0.)
              (23,24) (0.1) ..
SD_OA%_F   =DAY-SCHEDULE (1,6) (0.1)
              (7,15) (0.)
              (16,24) (0.1) ..
SD_OA%_D   =DAY-SCHEDULE (1,24) (0.1) ..

SW_ON      =WEEK-SCHEDULE (ALL) SD_ON ..
SW_OFF     =WEEK-SCHEDULE (ALL) SD_OFF ..
SW_WT_HT   =WEEK-SCHEDULE (ALL) SD_WT_HT ..
SW_SM_CL   =WEEK-SCHEDULE (ALL) SD_SM_CL ..
SW_SM_HT   =WEEK-SCHEDULE (ALL) SD_SM_HT ..
SW_WT_CL   =WEEK-SCHEDULE (ALL) SD_WT_CL ..

SW_OA%     =WEEK-SCHEDULE (MON) SD_OA%_W
              (TUE) SD_OA%_W
              (WED) SD_OA%_W
              (THU) SD_OA%_W
              (FRI) SD_OA%_F
              (SAT) SD_OA%_D
              (SUN) SD_OA%_D
              (HOL) SD_OA%_D ..

S_FULL_ON  =SCHEDULE THRU DEC 31 SW_ON ..
S_FULL_OFF =SCHEDULE THRU DEC 31 SW_OFF ..

$ HEATING SEASON
S_HE_SCHED =SCHEDULE THRU MAY 15 SW_ON
              THRU OCT 1 SW_OFF
              THRU DEC 31 SW_ON ..

$ COOLING SEASON
S_CL_SCHED =SCHEDULE THRU MAY 15 SW_OFF
              THRU OCT 1 SW_ON
              THRU DEC 31 SW_OFF ..

```



## \$ HEATING SET TEMP

S\_HT\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_HT  
THRU OCT 1 SW\_SM\_HT  
THRU DEC 31 SW\_WT\_HT ..

## \$ COOLING SET TEMP

S\_CL\_SET\_F =SCHEDULE THRU MAY 15 SW\_WT\_CL  
THRU OCT 1 SW\_SM\_CL  
THRU DEC 31 SW\_WT\_CL ..

S\_OA% =SCHEDULE THRU DEC 31 SW\_OA% ..

S\_HRLY-RPT =SCHEDULE THRU JAN 14 SW\_OFF  
THRU JAN 15 SW\_ON  
THRU AUG 22 SW\_OFF  
THRU AUG 23 SW\_ON  
THRU DEC 31 SW\_OFF ..

## \$ ZONE DESCRIPTION

S-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

W-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

E-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

CORE\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

N-PER\_ZONE =ZONE DESIGN-HEAT-T = 74.0 DESIGN-COOL-T = 72.0  
HEAT-TEMP-SCH = S\_HT\_SET\_F COOL-TEMP-SCH = S\_CL\_SET\_F  
ZONE-TYPE = CONDITIONED  
THERMOSTAT-TYPE = PROPORTIONAL THROTTLING-RANGE = 0.2  
SIZING-OPTION = FROM-LOADS ..

## \$ SYSTEM DESCRIPTION

```

MZ-SYSTEM =SYSTEM      SYSTEM-TYPE = MZS
                        MAX-SUPPLY-T = 120.0  MIN-SUPPLY-T = 55.0
                        HEATING-SCHEDULE = S_HE_SCHED
                        COOLING-SCHEDULE = S_CL_SCHED  PREHEAT-T = 0.0
                        OA-CONTROL = FIXED  SUPPLY-CFM = 14000.
                        RATED-CFM = 14000.  MIN-AIR-SCH = S_OA% ←
                        MAX-OA-FRACTION = 0.1  SUPPLY-DELTA-T = 2.7
                        SUPPLY-KW = 0.00088
                        MOTOR-PLACEMENT = OUTSIDE-AIRFLOW
                        NIGHT-CYCLE-CTRL = STAY-OFF  NIGHT-VENT-DT = 0.0
                        MIN-CFM-RATIO = 1.0  COOLING-CAPACITY = 402500.
                        COOL-SH-CAP = 362250.  HEATING-CAPACITY = -1225000.
                        SIZING-OPTION = COINCIDENT  RETURN-AIR-PATH = DUCT
                        ZONE-NAMES = (S-PER_ZONE, N-PER_ZONE, W-PER_ZONE,
                                      E-PER_ZONE, CORE_ZONE) ..

```

## \$ HOURLY REPORT DESCRIPTION

```

AHU-BLOCK =REPORT-BLOCK VARIABLE-TYPE = MZ-SYSTEM
                VARIABLE-LIST = (3,5,6,18,18,17) ..
ZONE-N-BLK =REPORT-BLOCK VARIABLE-TYPE = N-PER_ZONE
                VARIABLE-LIST = (17,18,7,31) ..
ZONE-S-BLK =REPORT-BLOCK VARIABLE-TYPE = S-PER_ZONE
                VARIABLE-LIST = (17,18,7,31) ..
HRLY-ZN-N = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                REPORT-BLOCK = (ZONE-N-BLK)
..
HRLY-ZN-S = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                REPORT-BLOCK = (ZONE-S-BLK)
..
HRLY-AHU = HOURLY-REPORT  REPORT-SCHEDULE = S_HRLY-RPT
                REPORT-BLOCK = (AHU-BLOCK)
..
END ..
COMPUTE SYSTEMS ..

INPUT PLANT ..

```

```

$-----$
$ E Z - D O E   P L A N T S   I N P U T $
$-----$

```

## \$ GENERAL PROJECT DATA

```

TITLE  LINE-1 *      EMC      ENGINEERS      INC.      *
        LINE-2 *EZDOE - ELITE SOFTWARE DEVELOPMENT INC*
        LINE-3 *      DENVER,      CO      80227      *

        LINE-4 *RUN #5 DAY INFILTRATION FOR BLDG.# 7656 *
        LINE-5 *GEN INST BLDG                                * ..

ABORT      ERRORS ..
DIAGNOSTIC WARNINGS ..
PLANT-REPORT  VERIFICATION=(PV-A)

```

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 16:15: 2 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG.# 7656 GEN INST BLDG  
 REPORT- SS-A SYSTEM MONTHLY LOADS SUMMARY FOR MZ-SYSTEM TOPEKA, KS

| MONTH | C O O L I N G               |                         |                      |                      | H E A T I N G               |                         |                      |                      | E L E C                                 |   |
|-------|-----------------------------|-------------------------|----------------------|----------------------|-----------------------------|-------------------------|----------------------|----------------------|---|---|
|       | COOLING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | HEATING<br>ENERGY<br>(MBTU) | TIME<br>OF MAX<br>DY HR | DRY-<br>BULB<br>TEMP | WET-<br>BULB<br>TEMP | MAXIMUM<br>HEATING<br>LOAD<br>(KBTU/HR) | MAXIMUM<br>ELEC-<br>TRICAL<br>ENERGY<br>(KWH) |
| JAN   | 0.00000                     |                         |                      |                      | -31.318                     | 15                      | 9                    | -5.5 F               | -195.836                                | 15412.  |
| FEB   | 0.00000                     |                         |                      |                      | -16.950                     | 28                      | 6                    | 12.5 F               | -151.127                                | 13870.  |
| MAR   | 0.00000                     |                         |                      |                      | -7.857                      | 6                       | 7                    | 19.5 F               | -126.789                                | 16067.  |
| APR   | 0.00000                     |                         |                      |                      | -1.946                      | 14                      | 23                   | 41.5 F               | -33.749                                 | 14958.  |
| MAY   | 46.30294                    | 16                      | 2                    | 62.5 F               | -0.943                      | 4                       | 23                   | 49.5 F               | -31.053                                 | 15412.  |
| JUN   | 97.04712                    | 28                      | 18                   | 89.5 F               | 0.000                       |                         |                      |                      | 0.000                                   | 15444.  |
| JUL   | 109.95313                   | 13                      | 18                   | 90.5 F               | 0.000                       |                         |                      |                      | 0.000                                   | 14926.  |
| AUG   | 112.14284                   | 11                      | 17                   | 98.5 F               | 0.000                       |                         |                      |                      | 0.000                                   | 16067.  |
| SEP   | 75.37170                    | 7                       | 17                   | 92.5 F               | 0.000                       |                         |                      |                      | 0.000                                   | 14958.  |
| OCT   | 1.19131                     | 1                       | 17                   | 85.5 F               | -2.272                      | 2                       | 2                    | 64.5 F               | -42.554                                 | 15084.  |
| NOV   | 0.00000                     |                         |                      |                      | -5.824                      | 13                      | 6                    | 25.5 F               | -95.343                                 | 14947.  |
| DEC   | 0.00000                     |                         |                      |                      | -23.534                     | 12                      | 6                    | 3.5 F                | -180.276                                | 15254.  |
| TOTAL | 442.008                     |                         |                      |                      | -90.643                     |                         |                      |                      | -195.836                                | 182382.                                       |
| MAX   |                             |                         |                      |                      |                             |                         |                      |                      |   | 33.457  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 16:15: 2 SDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG.# 7656 GEN INST BLDG  
 REPORT- SS-C SYSTEM MONTHLY LOAD HOURS FOR MZ-SYSTEM TOPEKA, KS

| MONTH  | HOURS           |                 |                   |          | N U M B E R O F            |                            |                              |                           | H O U R S                   |  |  |  | HOURS  |  |  |  | --COINCIDENT LOADS--                           |  |  |  |
|--------|-----------------|-----------------|-------------------|----------|----------------------------|----------------------------|------------------------------|---------------------------|-----------------------------|--|--|--|--|--|--|--|--|--|--|--|
|        | COOLING<br>LOAD | HEATING<br>LOAD | COOL-HEAT<br>LOAD | FLOATING | HOURS<br>HEATING<br>AVAIL. | HOURS<br>COOLING<br>AVAIL. | HOURS<br>FANS ON<br>CYCLE ON | HOURS<br>NIGHT<br>VENTING | FLOATING<br>WHEN<br>FANS ON | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) | HEATING<br>LOAD AT<br>COOLING<br>PEAK<br>(KBTU/HR) | ELECTRIC<br>LOAD AT<br>COOLING<br>PEAK<br>(KW) |  |  |  |
| JAN    | 0               | 744             | 0                 | 0        | 744                        | 0                          | 744                          | 0                         | 0                           | -11.934  | 12.320   | -11.934  | 12.320   | -11.934  | 12.320   | -11.934  | 12.320   |  |  |  |
| FEB    | 0               | 672             | 0                 | 0        | 672                        | 0                          | 672                          | 0                         | 0                           | -10.760  | 12.320   | -10.760  | 12.320   | -10.760  | 12.320   | -10.760  | 12.320   |  |  |  |
| MAR    | 0               | 744             | 0                 | 0        | 744                        | 0                          | 744                          | 0                         | 0                           | -11.299  | 12.320   | -11.299  | 12.320   | -11.299  | 12.320   | -11.299  | 12.320   |  |  |  |
| APR    | 0               | 720             | 0                 | 0        | 720                        | 0                          | 720                          | 0                         | 0                           | -5.838   | 12.320   | -5.838   | 12.320   | -5.838   | 12.320   | -5.838   | 12.320   |  |  |  |
| MAY    | 384             | 351             | 0                 | 9        | 360                        | 384                        | 744                          | 0                         | 9                           | 0.000  | 12.320   | 0.000  | 12.320   | 0.000  | 12.320   | 0.000  | 12.320   |  |  |  |
| JUN    | 720             | 0               | 0                 | 0        | 0                          | 720                        | 720                          | 0                         | 0                           | 0.000  | 33.457   | 0.000  | 33.457   | 0.000  | 33.457   | 0.000  | 33.457   |  |  |  |
| JUL    | 744             | 0               | 0                 | 0        | 0                          | 744                        | 744                          | 0                         | 0                           | 0.000  | 33.457   | 0.000  | 33.457   | 0.000  | 33.457   | 0.000  | 33.457   |  |  |  |
| AUG    | 744             | 0               | 0                 | 0        | 0                          | 744                        | 744                          | 0                         | 0                           | 0.000  | 33.457   | 0.000  | 33.457   | 0.000  | 33.457   | 0.000  | 33.457   |  |  |  |
| SEP    | 684             | 0               | 0                 | 36       | 720                        | 720                        | 720                          | 0                         | 36                          | 0.000  | 33.457   | 0.000  | 33.457   | 0.000  | 33.457   | 0.000  | 33.457   |  |  |  |
| OCT    | 16              | 720             | 0                 | 8        | 720                        | 24                         | 744                          | 0                         | 8                           | 0.000  | 12.320   | 0.000  | 12.320   | 0.000  | 12.320   | 0.000  | 12.320   |  |  |  |
| NOV    | 0               | 720             | 0                 | 0        | 720                        | 0                          | 720                          | 0                         | 0                           | -12.346  | 12.320   | -12.346  | 12.320   | -12.346  | 12.320   | -12.346  | 12.320   |  |  |  |
| DEC    | 0               | 744             | 0                 | 0        | 744                        | 0                          | 744                          | 0                         | 0                           | -109.211   | 12.320   | -109.211   | 12.320   | -109.211   | 12.320   | -109.211   | 12.320   |  |  |  |
| ANNUAL | 3292            | 5415            | 0                 | 53       | 5424                       | 3336                       | 8760                         | 0                         | 53                          |  |  |  |  |  |  |  |  |  |  |  |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 16:15: 2 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG.# 7656 GEN INST BLDG  
 REPORT- PS-B MONTHLY PEAK AND TOTAL ENERGY USE TOPEKA, KS

| MO  | UTILITY-<br>TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR | ELECTRICITY<br>54.503<br>117.563<br>28/ 8 | NATURAL-GAS<br>46.379<br>246.834<br>15/ 9 |
|-----|--|---|---|
| JAN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 54.503<br>117.563<br>28/ 8                | 46.379<br>246.834<br>15/ 9                |
| FEB | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 48.735<br>116.255<br>28/ 8                | 27.101<br>198.996<br>28/ 6                |
| MAR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 55.781<br>115.598<br>14/ 8                | 14.046<br>172.109<br>6/ 7                 |
| APR | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 51.609<br>114.746<br>4/ 8                 | 5.100<br>57.816<br>14/23                  |
| MAY | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 70.676<br>218.005<br>16/16                | 2.477<br>53.410<br>4/23                   |
| JUN | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 90.046<br>213.734<br>28/17                | 0.000<br>0.000<br>30/ 1                   |
| JUL | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 93.167<br>217.082<br>13/17                | 0.000<br>0.000<br>31/ 1                   |
| AUG | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 99.799<br>226.848<br>11/16                | 0.000<br>0.000<br>31/ 1                   |
| SEP | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 81.437<br>219.574<br>6/17                 | 0.000<br>0.000<br>30/ 1                   |
| OCT | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 52.650<br>114.854<br>26/20                | 5.633<br>72.205<br>2/ 2                   |
| NOV | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 51.867<br>114.952<br>28/ 8                | 11.198<br>136.490<br>13/ 6                |
| DEC | TOTAL (MBTU)<br>PEAK (KBTU)<br>DY/HR             | 53.741<br>118.069<br>12/ 8                | 36.238<br>230.413<br>12/ 6                |
|     | ONE YEAR<br>USE/PEAK                             | 804.011<br>226.848                        | 148.171<br>246.834                        |

EMC ENGINEERS INC. EDOE - ELITE SOFTWARE DEVELOPMENT INC DOE-2.1D 5/ 8/1995 16:15: 2 PDL RUN 1  
 DENVER, CO 80227 RUN #5 DAY INFILTRATION FOR BLDG.# 7656 GEN INST BLDG  
 REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE TOPEKA, KS

| ENERGY TYPE<br>IN SITE MBTU -<br>CATEGORY OF USE  | ELECTRICITY  | NATURAL-GAS                   |  |                             |
|---|--------------|-------------------------------|--|-----------------------------|
| SPACE HEAT  | 6.06         | 148.17                        |  |                             |
| SPACE COOL  | 157.65       | 0.00                          |  |                             |
| HVAC AUX  | 386.01       | 0.00                          |  |                             |
| DOM HOT WTR   | 0.00         | 0.00                          |  |                             |
| AUX SOLAR   | 0.00         | 0.00                          |  |                             |
| LIGHTS  | 203.97       | 0.00                          |  |                             |
| VERT TRANS  | 0.00         | 0.00                          |  |                             |
| MISC EQUIP  | 50.32        | 0.00                          |  |                             |
|   | -----        | -----                         |  |                             |
| TOTAL   | 804.01       | 148.17                        |  |                             |
|   |              |                               |  |                             |
| TOTAL SITE ENERGY   | 952.18 MBTU  | 84.2 KBTU/SQFT-YR GROSS-AREA  |  | 84.2 KBTU/SQFT-YR NET-AREA  |
| TOTAL SOURCE ENERGY   | 2562.62 MBTU | 226.5 KBTU/SQFT-YR GROSS-AREA |  | 226.6 KBTU/SQFT-YR NET-AREA |
| PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE  | = 1.2        |                               |  |                             |
| PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED   | = 0.0        |                               |  |                             |
| NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY. |              |                               |  |                             |



## UA CALCULATIONS

# **REPRESENTATIVE BUILDINGS FOR UA CALCULATIONS**

| GRP LTR | BLDG NO. | BLDG NAME            | SQ FT  | USE            | UA CALCS |
|---------|----------|----------------------|--------|----------------|----------|
| A       | 5000     | FIRE STATION         | 8,400  | 24 hours       |          |
| B       | 313      | CIV PERS BLDG        | 6,222  | Admin          | X        |
| B       | 804      | RGT HQ BUILD         | 10,241 | Admin          |          |
| B       | 7036     | REGIMENTAL HQ BLDG   | 10,010 | Admin          | X        |
| B       | 7178     | MOTOR POOL ADMIN     | 2,480  | Admin          |          |
| B       | 7450     | REGIMENTAL HQ BLDG   | 9,850  | Admin          |          |
| B       | 7636     | REGIMENTAL HQ BLDG   | 9,850  | Admin          |          |
| B       | 7834     | REGIMENTAL HQ BLDG   | 9,904  | Admin          | X        |
| B       | 8010     | DET DAY ROOM         | 2,100  | Admin          | X        |
| B       | 8020     | DET DAY ROOM         | 2,100  | Admin          |          |
| B       | 8046     | DET DAY ROOM         | 2,100  | Admin          |          |
| B       | 8056     | DET DAY ROOM         | 2,100  | Admin          |          |
| B       | 8071     | RGT HQ BUILD         | 9,963  | Admin          | X        |
| C       | 751      | AC PTS & TOE ST      | 9,834  | Admin & Supp   | X        |
| C       | 810      | ADMIN & SUPPLY BLDG  | 15,152 | Admin & Supp   | X        |
| C       | 812      | ADMIN & SUPPLY BLDG  | 23,559 | Admin & Supp   |          |
| C       | 835      | MAF OPS BLDG         | 19,470 | Admin & Supp   | X        |
| C       | 7212     | CO HQ BLDG           | 19,320 | Admin & Supp   | X        |
| C       | 7220     | CO HQ BLDG           | 18,870 | Admin & Supp   | X        |
| C       | 7243     | ADMIN & SUPPLY BLDG  | 17,829 | Admin & Supp   |          |
| C       | 7432     | ADMIN & SUPPLY BLDG  | 13,500 | Admin & Supp   |          |
| C       | 7602     | ADMIN & SUPPLY BLDG  | 13,520 | Admin & Supp   |          |
| C       | 7608     | ADMIN & SUPPLY BLDG  | 13,520 | Admin & Supp   |          |
| C       | 7652     | ADMIN & SUPPLY BLDG  | 13,520 | Admin & Supp   |          |
| C       | 7658     | ADMIN & SUPPLY BLDG  | 13,520 | Admin & Supp   |          |
| C       | 7802     | ADMIN & SUPPLY BLDG  | 13,280 | Admin & Supp   | X        |
| C       | 7808     | ADMIN & SUPPLY BLDG  | 13,280 | Admin & Supp   |          |
| C       | 7852     | ADMIN & SUPPLY BLDG  | 13,280 | Admin & Supp   |          |
| C       | 7858     | ADMIN & SUPPLY BLDG  | 13,280 | Admin & Supp   |          |
| C       | 8021     | ADMIN & SUPPLY BLDG  | 23,676 | Admin & Supp   | X        |
| C       | 8023     | ADMIN & SUPPLY BLDG  | 23,676 | Admin & Supp   |          |
| C       | 8057     | ADMIN & SUPPLY BLDG  | 23,676 | Admin & Supp   |          |
| C       | 8059     | ADMIN & SUPPLY BLDG  | 23,676 | Admin & Supp   |          |
| D       | 29       | RED CROSS BLDG       | 3,000  | Admin - block  | X        |
| D       | 200      | ADMIN GENERAL PURP   | 60,690 | Admin - block  |          |
| D       | 203      | CAVALRY MUSEUM       | 5,800  | Admin - block  | X        |
| D       | 205      | CAVALRY MUSEUM       | 16,496 | Admin - block  | X        |
| D       | 207      | CAVALRY MUSEUM       | 8,278  | Admin - block  |          |
| D       | 210      | MILIT PERS BLDG      | 58,448 | Admin - block  |          |
| D       | 211      | ADMIN                | 41,062 | Admin - block  | X        |
| D       | 222      | ADMIN GEN PURP       | 18,854 | Admin - block  |          |
| D       | 301      | FINANCE ADMIN        | 32,947 | Admin - block  |          |
| D       | 302      | FINANCE ADMIN        | 16,138 | Admin - block  | X        |
| D       | 330      | DEH ADMIN            | 14,913 | Admin - block  | X        |
| D       | 364      | UEMCS HQ             | 744    | Admin - block  | X        |
| D       | 403      | ADMIN GENERAL PURP   | 18,151 | Admin - block  |          |
| D       | 405      | ADMIN GEN PURP       | 10,778 | Admin - block  | X        |
| D       | 406      | CID BLDG             | 10,390 | Admin - block  | X        |
| D       | 500      | POST HQ BLDG         | 65,453 | Admin - block  |          |
| D       | 509      | ADM GEN PURPOSE      | 10,108 | Admin - block  |          |
| E       | 610      | ENL BARRACKS W/AS    | 29,004 | Barracks       | X        |
| E       | 620      | OFF QTRS MILIT       | 12,640 | Barracks       | X        |
| E       | 621      | OFF QTRS TRANS       | 10,723 | Barracks       |          |
| E       | 5309     | GUEST HOUSE          | 23,784 | Barracks       | X        |
| E       | 7050     | ENL BARRACKS W/AS    | 39,675 | Barracks & Din | X        |
| E       | 7053     | ENL BARRACKS W/AS    | 39,675 | Barracks & Din |          |
| E       | 7404     | ENL BARRACKS W/O DIN | 50,967 | Barracks       | X        |
| E       | 7424     | ENL BARRACKS W/O DIN | 50,967 | Barracks       | X        |
| E       | 7610     | ENL BARRACKS W/AS    | 41,892 | Barracks       | X        |
| E       | 7612     | ENL BARRACKS W/AS    | 41,892 | Barracks       |          |
| E       | 7614     | ENL BARRACKS W/AS    | 41,892 | Barracks       |          |
| E       | 7616     | ENL BARRACKS W/AS    | 41,892 | Barracks       |          |
| E       | 7618     | ENL BARRACKS W/O DIN | 41,892 | Barracks       | X        |
| E       | 7642     | ENL BARRACKS W/O DIN | 41,892 | Barracks       |          |
| E       | 7644     | ENL BARRACKS W/O DIN | 41,892 | Barracks       |          |
| E       | 7646     | ENL BARRACKS W/O DIN | 41,892 | Barracks       |          |
| E       | 7648     | ENL BARRACKS W/O DIN | 41,892 | Barracks       |          |
| E       | 7650     | ENL BARRACKS W/O DIN | 41,892 | Barracks       |          |
| E       | 7810     | ENL BARRACKS W/O DIN | 41,843 | Barracks       |          |
| E       | 7812     | ENL BARRACKS W/O DIN | 41,843 | Barracks       |          |
| E       | 7814     | ENL BARRACKS W/O DIN | 41,843 | Barracks       |          |
| E       | 7816     | ENL BARRACKS W/O DIN | 41,843 | Barracks       |          |
| E       | 7818     | ENL BARRACKS W/O DIN | 41,843 | Barracks       |          |
| E       | 7842     | ENL BARRACKS W/AS    | 41,843 | Barracks       |          |
| E       | 7844     | ENL BARRACKS W/O DIN | 41,843 | Barracks       |          |
| E       | 7846     | ENL BARRACKS W/AS    | 41,843 | Barracks       |          |



# **REPRESENTATIVE BUILDINGS FOR UA CALCULATIONS**

| GRP LTR | BLDG NO. | BLDG NAME            | SQ FT  | USE              | UA CALCS |
|---------|----------|----------------------|--------|------------------|----------|
| E       | 7848     | ENL BARRACKS W/O DIN | 41,843 | Barracks         |          |
| E       | 7850     | ENL BARRACKS W/AS    | 41,843 | Barracks         |          |
| E       | 8002     | ENL BARRACKS W/O DIN | 22,700 | Barracks         | X        |
| E       | 8006     | ENL BARRACKS W/O DIN | 22,700 | Barracks         |          |
| E       | 8008     | ENL BARRACKS W/O DIN | 11,549 | Barracks         | X        |
| E       | 8012     | ENL BARRACKS W/O DIN | 22,700 | Barracks         |          |
| E       | 8014     | ENL BARRACKS W/O DIN | 11,549 | Barracks         |          |
| E       | 8038     | ENL BARRACKS W/O DIN | 22,700 | Barracks         |          |
| E       | 8040     | ENL BARRACKS W/O DIN | 11,549 | Barracks         |          |
| E       | 8042     | ENL BARRACKS W/O DIN | 22,700 | Barracks         | X        |
| E       | 8048     | ENL BARRACKS W/O DIN | 11,549 | Barracks         |          |
| E       | 8050     | ENL BARRACKS W/O DIN | 11,549 | Barracks         |          |
| E       | 8052     | SR ENL QTRS          | 22,700 | Barracks         |          |
| E       | 8054     | ENL BARRACKS W/O DIN | 11,549 | Barracks         |          |
| H       | 27       | OFF QTRS MILIT       | 38,146 | Barracks - block |          |
| H       | 214      | ENL BARRACKS W/AS    | 35,821 | Barracks - block | X        |
| H       | 223      | ENL BARRACKS W/DAS   | 47,794 | Barracks - block | X        |
| H       | 227      | ENL BARRACKS W/AS    | 32,303 | Barracks - block |          |
| H       | 402      | ENL BARRACKS W/AS    | 35,718 | Barracks - block |          |
| H       | 404      | ENL BARRACKS W/DAS   | 35,718 | Barracks - block |          |
| H       | 409      | ENL BARRACKS W/AS    | 32,883 | Barracks - block |          |
| H       | 410      | ENL BARRACKS W/AS    | 32,883 | Barracks - block |          |
| H       | 411      | ENL BARRACKS W/AS    | 32,883 | Barracks - block |          |
| H       | 512      | SR ENL QTRS          | 13,619 | Barracks - block |          |
| H       | 540      | OFF QTRS MILIT       | 14,528 | Barracks - block | X        |
| H       | 541      | OFF QTRS MILIT       | 18,083 | Barracks - block | X        |
| H       | 542      | OFF QTRS MILIT       | 14,528 | Barracks - block |          |
| I       | 760      | BN HQ BLDG           | 7,364  | Battalion        |          |
| I       | 802      | BN ADMIN & CLRM      | 12,526 | Battalion        |          |
| I       | 808      | BN ADMIN & CLRM      | 12,526 | Battalion        |          |
| I       | 7017     | BN HQ BLDG           | 2,604  | Battalion        | X        |
| I       | 7028     | BN CLASSROOMS        | 3,733  | Battalion        | X        |
| I       | 7046     | BN CLASSROOMS        | 3,733  | Battalion        |          |
| I       | 7031     | BN HQ BLDG           | 3,733  | Battalion        | X        |
| I       | 7033     | BN HQ BLDG           | 4,083  | Battalion        | X        |
| I       | 7047     | BN HQ BLDG           | 3,733  | Battalion        |          |
| I       | 7048     | BN HQ BLDG           | 2,604  | Battalion        |          |
| I       | 7108     | BN ADMIN & CLRM      | 12,527 | Battalion        |          |
| I       | 7109     | BN ADMIN & CLRM      | 13,535 | Battalion        | X        |
| I       | 7215     | BN HQ BLDG           | 2,604  | Battalion        |          |
| I       | 7218     | BN HQ BLDG           | 12,625 | Battalion        |          |
| I       | 7270     | BN HQ BLDG           | 6,130  | Battalion        |          |
| I       | 7410     | BN ADMIN & CLRM      | 12,599 | Battalion        |          |
| I       | 7620     | BN ADMIN & CLRM      | 6,340  | Battalion        | X        |
| I       | 7622     | BN ADMIN & CLRM      | 12,380 | Battalion        |          |
| I       | 7624     | BN ADMIN & CLRM      | 6,158  | Battalion        |          |
| I       | 7630     | BN ADMIN & CLRM      | 6,158  | Battalion        |          |
| I       | 7638     | BN ADMIN & CLRM      | 6,158  | Battalion        |          |
| I       | 7806     | BN HQ BLDG           | 13,493 | Battalion        |          |
| I       | 7820     | BN ADMIN & CLRM      | 6,673  | Battalion        | X        |
| I       | 7824     | BN ADMIN & CLRM      | 12,246 | Battalion        |          |
| I       | 7836     | BN ADMIN & CLRM      | 12,246 | Battalion        |          |
| I       | 7854     | BN HQ BLDG           | 13,493 | Battalion        |          |
| I       | 8025     | BN ADMIN & CLRM      | 12,000 | Battalion        |          |
| I       | 8037     | BN ADMIN & CLRM      | 12,000 | Battalion        |          |
| I       | 5302     | POST OFFICE          | 12,240 | Post Office      | X        |
| K       | 5315     | MORRIS HILL CHAPEL   | 19,748 | Church           | X        |
| K       | 7086     | UNIT CHAPEL          | 8,696  | Church           |          |
| K       | 7865     | UNIT CHAPEL          | 8,718  | Church           | X        |
| L       | 3        | POST CHAPEL          | 8,828  | Church - block   | X        |
| L       | 6        | POST CHAPEL          | 6,230  | Church - block   |          |
| M       | 253      | DRUG ABUSE CTR       | 11,122 | Clinic           |          |
| M       | 602      | DENTAL CLINIC        | 11,557 | Clinic           | X        |
| M       | 814      | MEDICAL FAC - NEW    | 9,220  | Clinic           | X        |
| M       | 4010     | DENTAL CLINIC        | 15,587 | Clinic           | X        |
| M       | 7034     | CLINIC W/O BEDS      | 3,842  | Clinic           |          |
| M       | 7626     | CLINIC W/O BEDS      | 3,604  | Clinic           |          |
| M       | 7665     | DENTAL CLINIC        | 11,076 | Clinic           |          |
| M       | 7670     | DENTAL CLINIC        | 14,960 | Clinic           |          |
| M       | 7826     | CLINIC W/O BEDS      | 3,841  | Clinic           |          |
| M       | 8065     | CLINIC W/O BEDS      | 3,848  | Clinic           | X        |
| N       | 650      | COLD STOR FAC        | 22,331 | Cold Storage     |          |
| N       | 652      | COLD STOR FAC        | 8,167  | Cold Storage     |          |
| O       | 7245     | ENL PERS DIN         | 13,998 | Dining           |          |
| O       | 7606     | ENL PERS DIN         | 13,493 | Dining           |          |
| O       | 7654     | ENL PERS DIN         | 13,493 | Dining           |          |

# **REPRESENTATIVE BUILDINGS FOR UA CALCULATIONS**

| GRP LTR  | BLDG NO. | BLDG NAME              | SQ FT   | USE           | UA CALCS  |
|--|----------|------------------------|---------|---------------|-----------|
| O  | 7804     | ENL PERS DIN           | 13,493  | Dining        |           |
| O  | 7856     | ENL PERS DIN           | 13,493  | Dining        |           |
| O  | 8063     | ENL PERS DIN           | 18,313  | Dining        | X         |
| P  | 723      | MNT HANGAR COMB        | 21,640  | Hangar        | X         |
| P  | 727      | MNT HANGAR COMB        | 36,152  | Hangar        | X         |
| P  | 741      | MNT HANGAR COMB        | 38,898  | Hangar        |           |
| P  | 817      | MNT HANGAR AVUM        | 40,061  | Hangar        | X         |
| P  | 833      | AIRCRAFT HANGAR        | 52,080  | Hangar        | X         |
| P  | 853      | MNT HANGAR AVUM        | 48,112  | Hangar        |           |
| P  | 710      | TAC EQUIP SHOP         | 2,173   | Maintenance   | X         |
| P  | 820      | TAC EQUIP SHOP         | 20,564  | Maintenance   |           |
| P  | 840      | VEHICLE MNT SHOP ORG   | 9,152   | Maintenance   | X         |
| P  | 1470     | AR VEH MNT SHOP        | 21,667  | Maintenance   |           |
| P  | 7176     | MOTOR POOL MNT SHOP    | 4,880   | Maintenance   |           |
| P  | 7350     | VEH MNT SHOP ORG       | 21,345  | Maintenance   | X         |
| P  | 7500     | VEH MNT SHOP ORG       | 22,325  | Maintenance   |           |
| P  | 7520     | VEH MNT SHOP ORG       | 27,112  | Maintenance   |           |
| P  | 7760     | VEH MNT SHOP ORG       | 17,163  | Maintenance   | X         |
| P  | 7720     | VEH MNT SHOP ORG       | 22,325  | Maintenance   |           |
| P  | 7780     | VEH MNT SHOP ORG       | 17,163  | Maintenance   |           |
| P  | 7900     | VEH MNT SHOP ORG       | 20,943  | Maintenance   |           |
| P  | 7920     | VEH MNT SHOP DS        | 124,553 | Maintenance   | X         |
| P  | 7940     | VEH MNT SHOP ORG       | 22,405  | Maintenance   | X         |
| P  | 7960     | VEH MNT SHOP ORG       | 20,245  | Maintenance   |           |
| P  | 8100     | CONSOLIDATED MNT       | 224,927 | Maintenance   |           |
| P  | 8300     | VEH MNT SHOP ORG       | 20,240  | Maintenance   |           |
| P  | 8320     | VEH MNT SHOP ORG       | 20,240  | Maintenance   |           |
| P  | 8330     | VEH MNT SHOP ORG       | 39,256  | Maintenance   |           |
| P  | 8340     | VEH MNT SHOP ORG       | 20,240  | Maintenance   |           |
| P  | 8360     | VEH MNT SHOP ORG       | 39,428  | Maintenance   | X         |
| P  | 8370     | VEH MNT SHOP ORG       | 26,876  | Maintenance   |           |
| P  | 8380     | VEH MNT SHOP ORG       | 73,400  | Maintenance   | X         |
| P  | 8390     | TAC EQUIP SHOP         | 24,755  | Maintenance   |           |
| P  | 8410     | VEH MNT SHOP ORG       | 73,233  | Maintenance   | X         |
| R  | 806      | COMB AC-HTG PLANT      | 1,000   | Mechanical    |           |
| R  | 7210     | CH CHILLER PLANT       | 4,320   | Mechanical    |           |
| R  | 8073     | CH ENERGY PLANT        | 4,070   | Mechanical    |           |
| S  | 202      | PHYS FITNESS CTR       | 51,307  | Gym - block   | X         |
| S  | 5800     | YOUTH CTR              | 21,560  | Youth Center  | X         |
| S  | 6940     | INDOOR SWIM POOL       | 23,347  | Swimming Pool |           |
| S  | 7024     | GYMNASIUM              | 20,619  | Recreation    |           |
| S  | 7632     | GYMNASIUM              | 20,694  | Recreation    |           |
| S  | 7832     | GYMNASIUM              | 20,694  | Recreation    |           |
| S  | 8069     | IN SW POOL/GYM         | 25,620  | Swimming Pool |           |
| T  | 6910     | EXC SP ST FAC          | 2,525   | Retail        | X         |
| T  | 6914     | EXC MAIN RETL          | 63,930  | Retail        |           |
| T  | 7285     | CLOTHING SALES         | 17,042  | Retail        | X         |
| U  | 720      | AF OPS BLDG            | 3,705   | Simulator     | X         |
| U  | 722      | FLIGHT SIMULATOR       | 7,000   | Simulator     | X         |
| U  | 724      | FLIGHT SIMULATOR       | 13,188  | Simulator     |           |
| U  | 7739     | MOVING TARGET SIM BLDG | 4,074   | Simulator     | X         |
| V  | 7485     | BOWLING ALLEY          | 36,966  | Recreation    | X         |
| W  | 7866     | THEATER W/DRESS RM     | 11,098  | Theater       |           |
| W  | 206      | THEATER W/O DRESS RM   | 10,754  | Theater       |           |
| X  | 319      | GEN INSTRUCTION BLDG   | 9,690   | Training      | X         |
| X  | 6620     | COMMUN ACT CTR         | 31,740  | Training      | X         |
| X  | 6918     | SKILL DEV CTR          | 11,507  | Training      | X         |
| X  | 7264     | LIBRARY MAIN           | 31,240  | Training      |           |
| X  | 7305     | APP INSTR BLDG         | 9,872   | Training      | X         |
| X  | 7604     | GEN INST BLDG          | 13,493  | Training      | X         |
| X  | 7656     | GEN INST BLDG          | 13,493  | Training      | X         |
| X  | 8044     | APP INSTR BLDG         | 2,470   | Training      | X         |
| <b>TOTAL NUMBER OF BUILDINGS FOR UA CALCULATIONS</b> |          |                        |         |               | <b>80</b> |



# UA VALUES EXTRAPOLATED TO SIMILAR BUILDINGS

| GRP LTR | BLDG NO. | BLDG NAME            | SQ FT  | USE            | UA VALUE |
|---------|----------|----------------------|--------|----------------|----------|
| A       | 5000     | FIRE STATION         | 8,400  | 24 hours       | 2,186    |
| B       | 313      | CIV PERS BLDG        | 6,222  | Admin          | 1,941    |
| B       | 804      | RGT HQ BUILD         | 10,241 | Admin          | 2,665    |
| B       | 7036     | REGIMENTAL HQ BLDG   | 10,010 | Admin          | 2,605    |
| B       | 7178     | MOTOR POOL ADMIN     | 2,480  | Admin          | 645      |
| B       | 7450     | REGIMENTAL HQ BLDG   | 9,850  | Admin          | 2,563    |
| B       | 7636     | REGIMENTAL HQ BLDG   | 9,850  | Admin          | 2,563    |
| B       | 7834     | REGIMENTAL HQ BLDG   | 9,904  | Admin          | 2,577    |
| B       | 8010     | DET DAY ROOM         | 2,100  | Admin          | 665      |
| B       | 8020     | DET DAY ROOM         | 2,100  | Admin          | 665      |
| B       | 8046     | DET DAY ROOM         | 2,100  | Admin          | 665      |
| B       | 8056     | DET DAY ROOM         | 2,100  | Admin          | 665      |
| B       | 8071     | RGT HQ BUILD         | 9,963  | Admin          | 2,545    |
| C       | 751      | AC PTS & TOE ST      | 9,834  | Admin & Supp   | 3,641    |
| C       | 810      | ADMIN & SUPPLY BLDG  | 15,152 | Admin & Supp   | 4,538    |
| C       | 812      | ADMIN & SUPPLY BLDG  | 23,559 | Admin & Supp   | 7,056    |
| C       | 835      | MAF OPS BLDG         | 19,470 | Admin & Supp   | 4,060    |
| C       | 7212     | CO HQ BLDG           | 19,320 | Admin & Supp   | 7,306    |
| C       | 7220     | CO HQ BLDG           | 18,870 | Admin & Supp   | 4,949    |
| C       | 7243     | ADMIN & SUPPLY BLDG  | 17,829 | Admin & Supp   | 4,676    |
| C       | 7432     | ADMIN & SUPPLY BLDG  | 13,500 | Admin & Supp   | 4,746    |
| C       | 7602     | ADMIN & SUPPLY BLDG  | 13,520 | Admin & Supp   | 4,753    |
| C       | 7608     | ADMIN & SUPPLY BLDG  | 13,520 | Admin & Supp   | 4,753    |
| C       | 7652     | ADMIN & SUPPLY BLDG  | 13,520 | Admin & Supp   | 4,753    |
| C       | 7658     | ADMIN & SUPPLY BLDG  | 13,520 | Admin & Supp   | 4,753    |
| C       | 7802     | ADMIN & SUPPLY BLDG  | 13,280 | Admin & Supp   | 4,669    |
| C       | 7808     | ADMIN & SUPPLY BLDG  | 13,280 | Admin & Supp   | 4,669    |
| C       | 7852     | ADMIN & SUPPLY BLDG  | 13,280 | Admin & Supp   | 4,669    |
| C       | 7858     | ADMIN & SUPPLY BLDG  | 13,280 | Admin & Supp   | 4,669    |
| C       | 8021     | ADMIN & SUPPLY BLDG  | 23,676 | Admin & Supp   | 5,496    |
| C       | 8023     | ADMIN & SUPPLY BLDG  | 23,676 | Admin & Supp   | 5,496    |
| C       | 8057     | ADMIN & SUPPLY BLDG  | 23,676 | Admin & Supp   | 5,496    |
| C       | 8059     | ADMIN & SUPPLY BLDG  | 23,676 | Admin & Supp   | 5,496    |
| D       | 29       | RED CROSS BLDG       | 3,000  | Admin - block  | 2,004    |
| D       | 200      | ADMIN GENERAL PURP   | 60,690 | Admin - block  | 16,960   |
| D       | 203      | CAVALRY MUSEUM       | 5,800  | Admin - block  | 2,265    |
| D       | 205      | CAVALRY MUSEUM       | 16,496 | Admin - block  | 5,291    |
| D       | 207      | CAVALRY MUSEUM       | 8,278  | Admin - block  | 2,655    |
| D       | 210      | MILIT PERS BLDG      | 58,448 | Admin - block  | 10,220   |
| D       | 211      | ADMIN                | 41,062 | Admin - block  | 7,180    |
| D       | 222      | ADMIN GEN PURP       | 18,854 | Admin - block  | 3,297    |
| D       | 301      | FINANCE ADMIN        | 32,947 | Admin - block  | 7,152    |
| D       | 302      | FINANCE ADMIN        | 16,138 | Admin - block  | 3,503    |
| D       | 330      | DEH ADMIN            | 14,913 | Admin - block  | 3,515    |
| D       | 364      | UEMCS HQ             | 744    | Admin - block  | 676      |
| D       | 403      | ADMIN GENERAL PURP   | 18,151 | Admin - block  | 5,072    |
| D       | 405      | ADMIN GEN PURP       | 10,778 | Admin - block  | 3,012    |
| D       | 406      | CID BLDG             | 10,390 | Admin - block  | 3,389    |
| D       | 500      | POST HQ BLDG         | 65,453 | Admin - block  | 18,291   |
| D       | 509      | ADM GEN PURPOSE      | 10,108 | Admin - block  | 2,825    |
| E       | 610      | ENL BARRACKS W/AS    | 29,004 | Barracks       | 8,369    |
| E       | 620      | OFF QTRS MILIT       | 12,640 | Barracks       | 4,410    |
| E       | 621      | OFF QTRS TRANS       | 10,723 | Barracks       | 3,741    |
| E       | 5309     | GUEST HOUSE          | 23,784 | Barracks       | 6,555    |
| E       | 7050     | ENL BARRACKS W/AS    | 39,675 | Barracks & Din | 7,027    |
| E       | 7053     | ENL BARRACKS W/AS    | 39,675 | Barracks & Din | 7,027    |
| E       | 7404     | ENL BARRACKS W/O DIN | 50,967 | Barracks       | 18,554   |
| E       | 7424     | ENL BARRACKS W/O DIN | 50,967 | Barracks       | 15,693   |
| E       | 7610     | ENL BARRACKS W/AS    | 41,892 | Barracks       | 15,201   |
| E       | 7612     | ENL BARRACKS W/AS    | 41,892 | Barracks       | 15,201   |
| E       | 7614     | ENL BARRACKS W/AS    | 41,892 | Barracks       | 15,201   |
| E       | 7616     | ENL BARRACKS W/AS    | 41,892 | Barracks       | 15,201   |
| E       | 7618     | ENL BARRACKS W/O DIN | 41,892 | Barracks       | 15,201   |
| E       | 7642     | ENL BARRACKS W/O DIN | 41,892 | Barracks       | 15,201   |
| E       | 7644     | ENL BARRACKS W/O DIN | 41,892 | Barracks       | 15,201   |
| E       | 7646     | ENL BARRACKS W/O DIN | 41,892 | Barracks       | 15,201   |
| E       | 7648     | ENL BARRACKS W/O DIN | 41,892 | Barracks       | 15,201   |
| E       | 7650     | ENL BARRACKS W/O DIN | 41,892 | Barracks       | 15,201   |
| E       | 7810     | ENL BARRACKS W/O DIN | 41,843 | Barracks       | 15,183   |
| E       | 7812     | ENL BARRACKS W/O DIN | 41,843 | Barracks       | 15,183   |
| E       | 7814     | ENL BARRACKS W/O DIN | 41,843 | Barracks       | 15,183   |
| E       | 7816     | ENL BARRACKS W/O DIN | 41,843 | Barracks       | 15,183   |
| E       | 7818     | ENL BARRACKS W/O DIN | 41,843 | Barracks       | 15,183   |
| E       | 7842     | ENL BARRACKS W/AS    | 41,843 | Barracks       | 15,183   |
| E       | 7844     | ENL BARRACKS W/O DIN | 41,843 | Barracks       | 15,183   |

# UA VALUES EXTRAPOLATED TO SIMILAR BUILDINGS

| GRP LTR | BLDG NO. | BLDG NAME            | SQ FT  | USE              | UA VALUE |
|---------|----------|----------------------|--------|------------------|----------|
| E       | 7846     | ENL BARRACKS W/AS    | 41,843 | Barracks         | 15,183   |
| E       | 7848     | ENL BARRACKS W/O DIN | 41,843 | Barracks         | 15,183   |
| E       | 7850     | ENL BARRACKS W/AS    | 41,843 | Barracks         | 15,183   |
| E       | 8002     | ENL BARRACKS W/O DIN | 22,700 | Barracks         | 5,777    |
| E       | 8006     | ENL BARRACKS W/O DIN | 22,700 | Barracks         | 5,777    |
| E       | 8008     | ENL BARRACKS W/O DIN | 11,549 | Barracks         | 2,899    |
| E       | 8012     | ENL BARRACKS W/O DIN | 22,700 | Barracks         | 5,777    |
| E       | 8014     | ENL BARRACKS W/O DIN | 11,549 | Barracks         | 2,899    |
| E       | 8038     | ENL BARRACKS W/O DIN | 22,700 | Barracks         | 5,777    |
| E       | 8040     | ENL BARRACKS W/O DIN | 11,549 | Barracks         | 2,899    |
| E       | 8042     | ENL BARRACKS W/O DIN | 22,700 | Barracks         | 5,777    |
| E       | 8048     | ENL BARRACKS W/O DIN | 11,549 | Barracks         | 2,899    |
| E       | 8050     | ENL BARRACKS W/O DIN | 11,549 | Barracks         | 2,899    |
| E       | 8052     | SR ENL QTRS          | 22,700 | Barracks         | 5,777    |
| E       | 8054     | ENL BARRACKS W/O DIN | 11,549 | Barracks         | 2,899    |
| H       | 27       | OFF QTRS MILIT       | 38,146 | Barracks - block | 6,395    |
| H       | 214      | ENL BARRACKS W/AS    | 35,821 | Barracks - block | 6,005    |
| H       | 223      | ENL BARRACKS W/DAS   | 47,794 | Barracks - block | 7,623    |
| H       | 227      | ENL BARRACKS W/AS    | 32,303 | Barracks - block | 5,152    |
| H       | 402      | ENL BARRACKS W/AS    | 35,718 | Barracks - block | 5,697    |
| H       | 404      | ENL BARRACKS W/DAS   | 35,718 | Barracks - block | 5,697    |
| H       | 409      | ENL BARRACKS W/AS    | 32,883 | Barracks - block | 5,245    |
| H       | 410      | ENL BARRACKS W/AS    | 32,883 | Barracks - block | 5,245    |
| H       | 411      | ENL BARRACKS W/AS    | 32,883 | Barracks - block | 5,245    |
| H       | 512      | SR ENL QTRS          | 13,619 | Barracks - block | 2,172    |
| H       | 540      | OFF QTRS MILIT       | 14,528 | Barracks - block | 3,238    |
| H       | 541      | OFF QTRS MILIT       | 18,083 | Barracks - block | 3,933    |
| H       | 542      | OFF QTRS MILIT       | 14,528 | Barracks - block | 3,238    |
| I       | 760      | BN HQ BLDG           | 7,364  | Battalion        | 3,399    |
| I       | 802      | BN ADMIN & CLRM      | 12,526 | Battalion        | 5,781    |
| I       | 808      | BN ADMIN & CLRM      | 12,526 | Battalion        | 5,781    |
| I       | 7017     | BN HQ BLDG           | 2,604  | Battalion        | 1,162    |
| I       | 7028     | BN CLASSROOMS        | 3,733  | Battalion        | 1,723    |
| I       | 7046     | BN CLASSROOMS        | 3,733  | Battalion        | 1,723    |
| I       | 7031     | BN HQ BLDG           | 3,733  | Battalion        | 1,723    |
| I       | 7033     | BN HQ BLDG           | 4,083  | Battalion        | 1,960    |
| I       | 7047     | BN HQ BLDG           | 3,733  | Battalion        | 1,723    |
| I       | 7048     | BN HQ BLDG           | 2,604  | Battalion        | 1,202    |
| I       | 7108     | BN ADMIN & CLRM      | 12,527 | Battalion        | 2,984    |
| I       | 7109     | BN ADMIN & CLRM      | 13,535 | Battalion        | 3,224    |
| I       | 7215     | BN HQ BLDG           | 2,604  | Battalion        | 1,202    |
| I       | 7218     | BN HQ BLDG           | 12,625 | Battalion        | 3,007    |
| I       | 7270     | BN HQ BLDG           | 6,130  | Battalion        | 2,347    |
| I       | 7410     | BN ADMIN & CLRM      | 12,599 | Battalion        | 3,001    |
| I       | 7620     | BN ADMIN & CLRM      | 6,340  | Battalion        | 2,427    |
| I       | 7622     | BN ADMIN & CLRM      | 12,380 | Battalion        | 2,949    |
| I       | 7624     | BN ADMIN & CLRM      | 6,158  | Battalion        | 1,467    |
| I       | 7630     | BN ADMIN & CLRM      | 6,158  | Battalion        | 1,467    |
| I       | 7638     | BN ADMIN & CLRM      | 6,158  | Battalion        | 1,467    |
| I       | 7806     | BN HQ BLDG           | 13,493 | Battalion        | 3,214    |
| I       | 7820     | BN ADMIN & CLRM      | 6,673  | Battalion        | 2,512    |
| I       | 7824     | BN ADMIN & CLRM      | 12,246 | Battalion        | 2,917    |
| I       | 7836     | BN ADMIN & CLRM      | 12,246 | Battalion        | 2,917    |
| I       | 7854     | BN HQ BLDG           | 13,493 | Battalion        | 3,214    |
| I       | 8025     | BN ADMIN & CLRM      | 12,000 | Battalion        | 2,858    |
| I       | 8037     | BN ADMIN & CLRM      | 12,000 | Battalion        | 2,858    |
| I       | 5302     | POST OFFICE          | 12,240 | Post Office      | 2,645    |
| K       | 5315     | MORRIS HILL CHAPEL   | 19,748 | Church           | 6,485    |
| K       | 7086     | UNIT CHAPEL          | 8,696  | Church           | 2,856    |
| K       | 7865     | UNIT CHAPEL          | 8,718  | Church           | 2,526    |
| L       | 3        | POST CHAPEL          | 8,828  | Church - block   | 2,020    |
| L       | 6        | POST CHAPEL          | 6,230  | Church - block   | 1,426    |
| M       | 253      | DRUG ABUSE CTR       | 11,122 | Clinic           | 2,414    |
| M       | 602      | DENTAL CLINIC        | 11,557 | Clinic           | 1,060    |
| M       | 814      | MEDICAL FAC - NEW    | 9,220  | Clinic           | 1,449    |
| M       | 4010     | DENTAL CLINIC        | 15,587 | Clinic           | 2,715    |
| M       | 7034     | CLINIC W/O BEDS      | 3,842  | Clinic           | 1,595    |
| M       | 7626     | CLINIC W/O BEDS      | 3,604  | Clinic           | 1,496    |
| M       | 7665     | DENTAL CLINIC        | 11,076 | Clinic           | 4,597    |
| M       | 7670     | DENTAL CLINIC        | 14,960 | Clinic           | 6,209    |
| M       | 7826     | CLINIC W/O BEDS      | 3,841  | Clinic           | 1,594    |
| M       | 8065     | CLINIC W/O BEDS      | 3,848  | Clinic           | 1,597    |
| N       | 650      | COLD STOR FAC        | 22,331 | Cold Storage     | 0        |
| N       | 652      | COLD STOR FAC        | 8,167  | Cold Storage     | 0        |

# UA VALUES EXTRAPOLATED TO SIMILAR BUILDINGS

| GRP LTR | BLDG NO. | BLDG NAME              | SQ FT   | USE           | UA VALUE |
|---------|----------|------------------------|---------|---------------|----------|
| O       | 7245     | ENL PERS DIN           | 13,998  | Dining        | 2,545    |
| O       | 7606     | ENL PERS DIN           | 13,493  | Dining        | 2,454    |
| O       | 7654     | ENL PERS DIN           | 13,493  | Dining        | 2,454    |
| O       | 7804     | ENL PERS DIN           | 13,493  | Dining        | 2,454    |
| O       | 7856     | ENL PERS DIN           | 13,493  | Dining        | 2,454    |
| O       | 8063     | ENL PERS DIN           | 18,313  | Dining        | 3,330    |
| P       | 723      | MNT HANGAR COMB        | 21,640  | Hangar        | 9,771    |
| P       | 727      | MNT HANGAR COMB        | 36,152  | Hangar        | 13,826   |
| P       | 741      | MNT HANGAR COMB        | 38,898  | Hangar        | 14,876   |
| P       | 817      | MNT HANGAR AVUM        | 40,061  | Hangar        | 9,255    |
| P       | 833      | AIRCRAFT HANGAR        | 52,080  | Hangar        | 10,102   |
| P       | 853      | MNT HANGAR AVUM        | 48,112  | Hangar        | 9,332    |
| P       | 710      | TAC EQUIP SHOP         | 2,173   | Maintenance   | 1,462    |
| P       | 820      | TAC EQUIP SHOP         | 20,564  | Maintenance   | 8,561    |
| P       | 840      | VEHICLE MNT SHOP ORG   | 9,152   | Maintenance   | 3,810    |
| P       | 1470     | AR VEH MNT SHOP        | 21,667  | Maintenance   | 9,020    |
| P       | 7176     | MOTOR POOL MNT SHOP    | 4,880   | Maintenance   | 2,032    |
| P       | 7350     | VEH MNT SHOP ORG       | 21,345  | Maintenance   | 9,281    |
| P       | 7500     | VEH MNT SHOP ORG       | 22,325  | Maintenance   | 9,707    |
| P       | 7520     | VEH MNT SHOP ORG       | 27,112  | Maintenance   | 11,789   |
| P       | 7760     | VEH MNT SHOP ORG       | 17,163  | Maintenance   | 8,285    |
| P       | 7720     | VEH MNT SHOP ORG       | 22,325  | Maintenance   | 9,707    |
| P       | 7780     | VEH MNT SHOP ORG       | 17,163  | Maintenance   | 7,463    |
| P       | 7900     | VEH MNT SHOP ORG       | 20,943  | Maintenance   | 9,106    |
| P       | 7920     | VEH MNT SHOP DS        | 124,553 | Maintenance   | 43,349   |
| P       | 7940     | VEH MNT SHOP ORG       | 22,405  | Maintenance   | 9,609    |
| P       | 7960     | VEH MNT SHOP ORG       | 20,245  | Maintenance   | 8,683    |
| P       | 8100     | CONSOLIDATED MNT       | 224,927 | Maintenance   | 78,283   |
| P       | 8300     | VEH MNT SHOP ORG       | 20,240  | Maintenance   | 8,801    |
| P       | 8320     | VEH MNT SHOP ORG       | 20,240  | Maintenance   | 8,801    |
| P       | 8330     | VEH MNT SHOP ORG       | 39,256  | Maintenance   | 17,069   |
| P       | 8340     | VEH MNT SHOP ORG       | 20,240  | Maintenance   | 8,801    |
| P       | 8360     | VEH MNT SHOP ORG       | 39,428  | Maintenance   | 17,691   |
| P       | 8370     | VEH MNT SHOP ORG       | 26,876  | Maintenance   | 11,686   |
| P       | 8380     | VEH MNT SHOP ORG       | 73,400  | Maintenance   | 15,834   |
| P       | 8390     | TAC EQUIP SHOP         | 24,755  | Maintenance   | 10,764   |
| P       | 8410     | VEH MNT SHOP ORG       | 73,233  | Maintenance   | 15,834   |
| R       | 806      | COMB AC-HTG PLANT      | 1,000   | Mechanical    | 0        |
| R       | 7210     | CH CHILLER PLANT       | 4,320   | Mechanical    | 0        |
| R       | 8073     | CH ENERGY PLANT        | 4,070   | Mechanical    | 0        |
| S       | 202      | PHYS FITNESS CTR       | 51,307  | Gym - block   | 6,674    |
| S       | 5800     | YOUTH CTR              | 21,560  | Youth Center  | 2,572    |
| S       | 6940     | INDOOR SWIM POOL       | 23,347  | Swimming Pool | 3,037    |
| S       | 7024     | GYMNASIUM              | 20,619  | Recreation    | 2,682    |
| S       | 7632     | GYMNASIUM              | 20,694  | Recreation    | 2,692    |
| S       | 7832     | GYMNASIUM              | 20,694  | Recreation    | 2,692    |
| S       | 8069     | IN SW POOL/GYM         | 25,620  | Swimming Pool | 3,333    |
| T       | 6910     | EXC SP ST FAC          | 2,525   | Retail        | 789      |
| T       | 6914     | EXC MAIN RETL          | 63,930  | Retail        | 18,359   |
| T       | 7285     | CLOTHING SALES         | 17,042  | Retail        | 4,894    |
| U       | 720      | AF OPS BLDG            | 3,705   | Simulator     | 1,587    |
| U       | 722      | FLIGHT SIMULATOR       | 7,000   | Simulator     | 1,718    |
| U       | 724      | FLIGHT SIMULATOR       | 13,188  | Simulator     | 3,237    |
| U       | 7739     | MOVING TARGET SIM BLDG | 4,074   | Simulator     | 1,901    |
| V       | 7485     | BOWLING ALLEY          | 36,966  | Recreation    | 6,305    |
| W       | 7866     | THEATER W/DRESS RM     | 11,098  | Theater       | 3,187    |
| W       | 206      | THEATER W/O DRESS RM   | 10,754  | Theater       | 3,088    |
| X       | 319      | GEN INSTRUCTION BLDG   | 9,690   | Training      | 2,244    |
| X       | 6620     | COMMUN ACT CTR         | 31,740  | Training      | 4,433    |
| X       | 6918     | SKILL DEV CTR          | 11,507  | Training      | 3,864    |
| X       | 7264     | LIBRARY MAIN           | 31,240  | Training      | 4,363    |
| X       | 7305     | APP INSTR BLDG         | 9,872   | Training      | 3,353    |
| X       | 7604     | GEN INST BLDG          | 13,493  | Training      | 3,640    |
| X       | 7656     | GEN INST BLDG          | 13,493  | Training      | 3,640    |
| X       | 8044     | APP INSTR BLDG         | 2,470   | Training      | 839      |



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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |             |
|----------------------|--------|------------|-------------|
| BLDG NO:             | 3      | BLDG NAME: | POST CHAPEL |
| BLDG FUNCTION:       | CHAPEL |            |             |
| FLOOR AREA: (SQ. FT) | 4,340  | # FLOORS:  | 1           |
| SLAB PERIMETER: (FT) | 299    |            |             |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST | TOTAL |
|---|----------|-------|----------------|----------|------|-------|
| WALLS, GROSS  | (SQ. FT) | 1,841 | 1,841          | 737      | 737  | 5,156 |
| GLASS   | (SQ. FT) | 130   | 130            | 0        | 30   | 290   |
| PERSONNEL DOOR  | (SQ. FT) | 21    | 21             | 60       | 0    | 102   |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0    | 0     |
| WALLS, NET  | (SQ. FT) | 1,690 | 1,690          | 677      | 707  | 4,764 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |      | 2,150 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) |      | 102   |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |      | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|   |             |                                      |                     |            |
|---|-------------|--------------------------------------|---------------------|------------|
| II. CONSTRUCTION: (FIELD VERIFIED WALL, ROOF, WINDOW, DOOR, ETC.) |             | COMPONENTS                           |                     | R-VALUE    |
| WALLS: (SKETCH CROSS SECTION OF WALL)                             |             | 1.                                   | OUTSIDE AIR FILM    | 0.17       |
|   |             | 2.                                   | 18" SANDSTONE       | 1.44       |
|   |             | 3.                                   | AIR SPACE           | 1.00       |
|   |             | 4.                                   | 3/16" GYPSUM BD.    | 0.45       |
|   |             | 5.                                   |                     |            |
|   |             | 6.                                   |                     |            |
|   |             | 7.                                   | INSIDE AIR FILM     | 0.68       |
|   |             | TOTAL R-WALL =                       |                     | 3.74       |
|   |             | U=1/R                                |                     | 0.267      |
|   |             |                                      |                     |            |
|   |             | ROOF: (SKETCH CROSS SECTION OF ROOF) |                     | COMPONENTS |
|   |             | 1.                                   | OUTSIDE AIR FILM    | 0.17       |
|   |             | 2.                                   | ASPHALT SHINGLES    | 0.44       |
|   |             | 3.                                   | 1/2" PLYWOOD        | 0.62       |
|   |             | 4.                                   | 2" RIGID INSULATION | 5.56       |
|   |             | 5.                                   | AIR SPACE           | 1.00       |
|   |             | 6.                                   | 625 GYPSUM PLASTER  | 0.39       |
|   |             | 7.                                   | INSIDE AIR FILM     | 0.68       |
|   |             | TOTAL R-ROOF =                       |                     | 8.86       |
|   |             | U=1/R                                |                     | 0.113      |
|   |             |                                      |                     |            |
| GLASS TYPE:   | DOUBLE PANE | R-GLASS                              | 1.75                |            |
| SLAB TYPE FLOOR:  | CONCRETE    | SLF                                  | 0.68                |            |
| BASEMENT TYPE:  | NONE        | R-BASEM.                             | 0.00                |            |
| OVERHEAD DOOR TYPE:   | NONE        | R-ODOOR                              | 0.00                |            |
| PERSONNEL DOOR TYPE:  | WOOD        | R-PDOOR                              | 1.88                |            |

#### III. INFILTRATION:

|                                   |                       |                      |       |                          |       |    |    |
|-----------------------------------|-----------------------|----------------------|-------|--------------------------|-------|----|----|
| WINDOWS (LF of Crack)             | 105 X 0.27 Sq.In./LF= | Sq.In.               | 28    | X CFM/Sq.In.             | 1.530 | =  | 43 |
| PERSONNEL DOORS (SF)              | 102 X 0.16 Sq.In./SF= | Sq.In.               | 16    | X CFM/Sq.In.             | 1.530 | =  | 25 |
|                                   |                       |                      |       |                          |       |    |    |
| DOOR OPENINGS / HR - SINGLE DOOR  | 2                     | X CFM / OPENING / HR | 1.600 | =                        | 3     |    |    |
| DOOR OPENINGS / HR - DOUBLE DOORS | 4                     | X CFM / OPENING / HR | 1.385 | =                        | 6     |    |    |
|                                   |                       |                      |       | TOTAL INFILTRATION (CFM) | =     | 77 |    |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 102   | X DOOR "U"  | 0.532 | = | 54    |
| UA WALL             | = | WALL AREA   | 4,764 | X WALL "U"  | 0.267 | = | 1,274 |
| UA ROOF             | = | ROOF AREA   | 2,150 | X ROOF "U"  | 0.113 | = | 243   |
| UA GLASS            | = | GLASS AREA  | 290   | X GLASS "U" | 0.571 | = | 166   |
| UA SLAB             | = | SLAB PERIM. | 299   | X SLF       | 0.680 | = | 203   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE "U"  | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 77    | X A. T. F.  | 1.037 | = | 80    |
| TOTAL UA (BTU/HR°F) |   |             |       |             |       |   | 2,020 |



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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |                |
|----------------------|-------|------------|----------------|
| BLDG NO:             | 29    | BLDG NAME: | RED CROSS BLDG |
| BLDG FUNCTION:       |       |            |                |
| FLOOR AREA: (SQ. FT) | 2,994 | # FLOORS:  | 2              |
| SLAB PERIMETER: (FT) | 222   |            |                |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST | TOTAL |
|---|----------|-------|----------------|----------|------|-------|
| WALLS, GROSS  | (SQ. FT) | 1,455 | 1,452          | 780      | 912  | 4,599 |
| GLASS   | (SQ. FT) | 248   | 212            | 114      | 91   | 664   |
| PERSONNEL DOOR  | (SQ. FT) | 20    | 31             | 0        | 0    | 51    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0    | 0     |
| WALLS, NET  | (SQ. FT) | 1,187 | 1,209          | 666      | 821  | 3,883 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |      | 2,994 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) |      | 51    |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |      | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |   | COMPONENTS          | R-VALUE |
|---------------------------------------|---|---------------------|---------|
|                                       | 1.  | OUTSIDE AIR FILM    | 0.17    |
|                                       | 2.  | 18" SANDSTONE BLOCK | 1.44    |
|                                       | 3.  | AIR SPACE           | 1.00    |
|                                       | 4.  | 1/2" GYPSUM BOARD   | 0.45    |
|                                       | 5.  |                     |         |
|                                       | 6.  |                     |         |
|                                       | 7.  | INSIDE AIR FILM     | 0.68    |
|                                       | TOTAL R-WALL =                              |                     | 3.74    |
|                                       | U=1/R                                       |                     | 0.267   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |   | COMPONENTS          | R-VALUE |
|                                       | 1.  | OUTSIDE AIR FILM    | 0.17    |
|                                       | 2.  | ASPHALT SHINGLES    | 0.44    |
|                                       | 3.  | 3/4" WOOD           | 0.83    |
|                                       | 4.  | AIR SPACE           | 1.00    |
|                                       | 5.  | 3" BATT INSUL.      | 11.00   |
|                                       | 6.  | 0.625" PLASTER      | 0.39    |
|                                       | ACOUSTIC TILE                               |                     | 1.79    |
|                                       | 7.  | INSIDE AIR FILM     | 0.68    |
|                                       | TOTAL R-ROOF =                              |                     | 16.30   |
| U=1/R                                 |   | 0.061               |         |
|                                       |   |                     |         |
| GLASS TYPE:                           | SINGLE PANE IN ALUM. FRAMES W/STORM WINDOWS | R-GLASS             | 1.60    |
| SLAB TYPE FLOOR:                      | CONCRETE                                    | SLF                 | 0.68    |
| BASEMENT TYPE:                        | CONCRETE                                    | R-BASEM.            | 10.00   |
| OVERHEAD DOOR TYPE:                   | NONE  | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE:                  | WOOD  | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                       |                      |       |              |       |   |     |
|-----------------------------------|-----------------------|----------------------|-------|--------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 324 X 0.33 Sq.In./LF= | Sq.In.               | 107   | X CFM/Sq.In. | 1.530 | = | 164 |
| PERSONNEL DOORS (SF)              | 56 X 0.16 Sq.In./SF=  | Sq.In.               | 9     | X CFM/Sq.In. | 1.530 | = | 14  |
| DOOR OPENINGS / HR - SINGLE DOOR  | 1                     | X CFM / OPENING / HR | 1.600 | =            | 2     |   |     |
| DOOR OPENINGS / HR - DOUBLE DOORS | 2                     | X CFM / OPENING / HR | 1.385 | =            | 2     |   |     |
| TOTAL INFILTRATION (CFM)          |                       |                      |       |              |       | = | 181 |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 51    | X DOOR "U"  | 0.552 | = | 28    |
| UA WALL             | = | WALL AREA   | 3,883 | X WALL "U"  | 0.267 | = | 1,038 |
| UA ROOF             | = | ROOF AREA   | 2,994 | X ROOF "U"  | 0.061 | = | 184   |
| UA GLASS            | = | GLASS AREA  | 664   | X GLASS "U" | 0.625 | = | 415   |
| UA SLAB             | = | SLAB PERIM. | 222   | X SLF       | 0.680 | = | 151   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE. "U" | 0.100 | = | 0     |
| INFILTRATION        | = | CFM         | 181   | X A. T. F.  | 1.037 | = | 188   |
| TOTAL UA (BTU/HR°F) |   |             |       |             |       |   | 2,004 |

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### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |           |
|----------------------|--------|------------|-----------|
| BLDG NO:             | 202    | BLDG NAME: | GYMNASIUM |
| BLDG FUNCTION:       | GYM    |            |           |
| FLOOR AREA: (SQ. FT) | 51,321 | # FLOORS:  | 2         |
| SLAB PERIMETER: (FT) | 813    |            |           |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST  | WEST     | TOTAL  |
|---|----------|-------|----------------|-------|----------|--------|
| WALLS, GROSS  | (SQ. FT) | 3,682 | 3,682          | 6,677 | 6,677    | 20,719 |
| GLASS   | (SQ. FT) | 324   | 324            | 156   | 164      | 968    |
| PERSONNEL DOOR  | (SQ. FT) | 42    | 42             | 42    | 168      | 294    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0     | 0        | 0      |
| WALLS, NET  | (SQ. FT) | 3,316 | 3,316          | 6,479 | 6,345    | 19,457 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) |          |       |                |       | (SQ. FT) | 31,296 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR |       | (SQ. FT) | 294    |
| BASEMENT WALLS  | (SQ. FT) |       |                |       |          | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|   |             |                     |         |
|---|-------------|---------------------|---------|
| II. CONSTRUCTION: (1) FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES |             |                     |         |
| WALLS: (SKETCH CROSS SECTION OF WALL)                               |             | COMPONENTS          | R-VALUE |
|   |             | 1. OUTSIDE AIR FILM | 0.17    |
|   |             | 2. 18" SANDSTONE    | 1.44    |
|   |             | 3. AIR SPACE        | 1.00    |
|   |             | 4. 1" INSULATION    | 4.00    |
|   |             | 5. 1/2" GYP BD      | 0.45    |
|   |             | 6.                  |         |
|   |             | 7. INSIDE AIR FILM  | 0.68    |
|   |             | TOTAL R-WALL =      | 7.74    |
|   |             | U=1/R               | 0.129   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                |             | COMPONENTS          | R-VALUE |
|   |             | 1. OUTSIDE AIR FILM | 0.17    |
|   |             | 2. SHINGLES         | 0.44    |
|   |             | 3. 3/4" WOOD        | 0.83    |
|   |             | 4. AIR SPACE        | 1.00    |
|   |             | 5. INSUL            | 11.93   |
|   |             | 6. 1/2" GYP BD      | 0.45    |
|   |             | 7. INSIDE AIR FILM  | 0.68    |
|   |             | TOTAL R-ROOF =      | 15.50   |
|   |             | U=1/R               | 0.065   |
| GLASS TYPE:   | SINGLE PANE | R-GLASS             | 0.90    |
| SLAB TYPE FLOOR:  | CONCRETE    | SLF                 | 0.68    |
| BASEMENT TYPE:  | NONE        | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE:   | NONE        | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE:  | WOOD        | R-PDOOR             | 1.88    |

#### III. INFILTRATION:

|                                   |                       |        |                      |                          |       |       |     |    |
|-----------------------------------|-----------------------|--------|----------------------|--------------------------|-------|-------|-----|----|
| INFILTRATION:                     |                       |        |                      |                          |       |       |     |    |
| WINDOWS (LF of Crack)             | 482 X 0.33 Sq.in./LF= | Sq.in. | 159                  | X CFM/Sq.in.             | 1.530 | =     | 243 |    |
| PERSONNEL DOORS (SF)              | 294 X 0.16 Sq.in./SF= | Sq.in. | 47                   | X CFM/Sq.in.             | 1.530 | =     | 72  |    |
|                                   |                       |        |                      |                          |       |       |     |    |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM / OPENING / HR |                          | 1.600 | =     | 0   |    |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | 20                   | X CFM / OPENING / HR     |       | 1.385 | =   | 28 |
|                                   |                       |        |                      | TOTAL INFILTRATION (CFM) |       | =     | 343 |    |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 294    | X DOOR "U"  | 0.532 | = | 156   |
| UA WALL             | = | WALL AREA   | 19,457 | X WALL "U"  | 0.129 | = | 2,514 |
| UA ROOF             | = | ROOF AREA   | 31,296 | X ROOF "U"  | 0.065 | = | 2,020 |
| UA GLASS            | = | GLASS AREA  | 968    | X GLASS "U" | 1.111 | = | 1,076 |
| UA SLAB             | = | SLAB PERIM. | 813    | X SLF       | 0.680 | = | 553   |
| UA BASEM.           | = | B-WALL AREA | 0      | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 343    | X A. T. F.  | 1.037 | = | 356   |
| TOTAL UA (BTU/HR°F) |   |             |        |             |       |   | 6,674 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 18-Jul-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |           |            |                |
|----------------------|-----------|------------|----------------|
| BLDG NO:             | 203       | BLDG NAME: | CAVALRY MUSEUM |
| BLDG FUNCTION:       | MUSEUM    |            |                |
| FLOOR AREA: (SQ. FT) | 4,186     | # FLOORS:  | 1              |
| SLAB PERIMETER: (FT) | MECH ROOM |            |                |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST  | WEST     | TOTAL |
|---|----------|-------|----------------|-------|----------|-------|
| WALLS, GROSS  | (SQ. FT) | 541   | 541            | 1,150 | 1,150    | 3,383 |
| GLASS   | (SQ. FT) | 39    | 39             | 215   | 215      | 507   |
| PERSONNEL DOOR  | (SQ. FT) | 0     | 0              | 0     | 84       | 84    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0     | 0        | 0     |
| WALLS, NET  | (SQ. FT) | 502   | 502            | 936   | 852      | 2,792 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) |          |       |                |       | (SQ. FT) | 5,454 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR |       | (SQ. FT) | 84    |
| BASEMENT WALLS  | (SQ. FT) |       |                |       |          | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |                         | COMPONENTS          | R-VALUE |
|---------------------------------------|-------------------------|---------------------|---------|
|                                       | 1.                      | OUTSIDE AIR FILM    | 0.17    |
|                                       | 2.                      | 16" SANDSTONE BLOCK | 1.28    |
|                                       | 3.                      | 3/16" GYPSUM BOARD  | 0.45    |
|                                       | 4.                      |                     |         |
|                                       | 5.                      |                     |         |
|                                       | 6.                      |                     |         |
|                                       | 7.                      | INSIDE AIR FILM     | 0.68    |
|                                       | TOTAL R-WALL =          |                     | 2.58    |
|                                       | U=1/R                   |                     | 0.388   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |                         | COMPONENTS          | R-VALUE |
|                                       | 1.                      | OUTSIDE AIR FILM    | 0.17    |
|                                       | 2.                      | ASPHALT SHINGLES    | 0.44    |
|                                       | 3.                      | 60# ROLL ROOFING    | 1.47    |
|                                       | 4.                      | ASPHALT FELT        | 0.12    |
|                                       | 5.                      | AIR SPACE           | 1.00    |
|                                       | 6.                      | 3/8" PLYWOOD        | 0.46    |
|                                       | 7.                      | INSIDE AIR FILM     | 0.68    |
|                                       | TOTAL R-ROOF =          |                     | 4.34    |
|                                       | U=1/R                   |                     | 0.230   |
| GLASS TYPE:                           | SINGLE PANE WITH STORMS | R-GLASS             | 1.60    |
| SLAB TYPE FLOOR:                      | CONCRETE                | SLF                 | 0.68    |
| BASEMENT TYPE:                        | NONE                    | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE                    | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL            | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |    |                          |       |   |     |
|-----------------------------------|-----------------------|--------|----|--------------------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 234 X 0.33 Sq.In./LF= | Sq.In. | 77 | X CFM/Sq.In.             | 1.530 | = | 118 |
| PERSONNEL DOORS (SF)              | 84 X 0.16 Sq.In./SF=  | Sq.In. | 13 | X CFM/Sq.In.             | 1.530 | = | 21  |
|                                   |                       |        |    |                          |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        |    | X CFM / OPENING / HR     | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        |    | X CFM / OPENING / HR     | 1.385 | = | 0   |
|                                   |                       |        |    | TOTAL INFILTRATION (CFM) |       | = | 139 |

|                     |   |                       |       |             |       |   |       |
|---------------------|---|-----------------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA            | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA            | 84    | X DOOR "U"  | 0.552 | = | 46    |
| UA WALL             | = | WALL AREA             | 2,792 | X WALL "U"  | 0.388 | = | 1,082 |
| UA ROOF             | = | ROOF AREA             | 5,454 | X ROOF "U"  | 0.230 | = | 1,257 |
| UA GLASS            | = | GLASS AREA            | 507   | X GLASS "U" | 0.625 | = | 317   |
| UA SLAB             | = | SLAB PERIM. MECH ROOM |       | X SLF       | 0.680 | = | 0     |
| UA BASEM.           | = | B-WALL AREA           | 0     | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM                   | 139   | X A. T. F.  | 0.852 | = | 118   |
| TOTAL UA (BTU/HR°F) |   |                       |       |             |       |   | 2,820 |

E M C ENGINEERS, INC.  
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 LOCATION: FT. RILEY, KANSAS

DATE: 18-Jul-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |             |            |                |
|----------------------|-------------|------------|----------------|
| BLDG NO:             | 205         | BLDG NAME: | CALVARY MUSEUM |
| BLDG FUNCTION:       | MUSEUM      |            |                |
| FLOOR AREA: (SQ. FT) | 19,533      | # FLOORS:  | 3              |
| SLAB PERIMETER: (FT) | CRAWL SPACE |            |                |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH | EAST           | WEST     | TOTAL  |
|---|----------|-------|-------|----------------|----------|--------|
| WALLS, GROSS  | (SQ. FT) | 2,686 | 2,686 | 3,868          | 4,420    | 13,660 |
| GLASS   | (SQ. FT) | 288   | 216   | 540            | 621      | 1,665  |
| PERSONNEL DOOR  | (SQ. FT) | 21    | 21    | 42             | 21       | 105    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0     | 0              | 0        | 0      |
| WALLS, NET  | (SQ. FT) | 2,377 | 2,449 | 3,286          | 3,778    | 11,890 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |       |                |          | 19,533 |
| OVERHEAD DOOR   | (SQ. FT) | 0     |       | PERSONNEL DOOR | (SQ. FT) | 105    |
| BASEMENT WALLS  | (SQ. FT) |       |       |                |          | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|   |                             |                |                     |         |
|---|-----------------------------|----------------|---------------------|---------|
| II. CONSTRUCTION: ( [ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES ) |                             | COMPONENTS     |                     | R-VALUE |
| WALLS: (SKETCH CROSS SECTION OF WALL)                                   |                             | 1.             | OUTSIDE AIR FILM    | 0.17    |
|   |                             | 2.             | 18" SANDSTONE BLOCK | 1.44    |
|   |                             | 3.             | AIR SPACE           | 1.00    |
|   |                             | 4.             | 2" RIGID INSULATION | 5.56    |
|   |                             | 5.             | 1/2" GYPSUM BOARD   | 0.45    |
|   |                             | 6.             |                     |         |
|   |                             | 7.             | INSIDE AIR FILM     | 0.68    |
|   |                             | TOTAL R-WALL = |                     | 9.30    |
|   |                             | U=1/R          |                     | 0.108   |
|   |                             |                |                     |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                    |                             | COMPONENTS     |                     | R-VALUE |
|   |                             | 1.             | OUTSIDE AIR FILM    | 0.17    |
|   |                             | 2.             | ASPHALT SHINGLES    | 0.44    |
|   |                             | 3.             | 3/4" WOOD           | 0.83    |
|   |                             | 4.             | AIR SPACE           | 1.00    |
|   |                             | 5.             | 1" RIGID INSULATION | 2.78    |
|   |                             | 6.             |                     |         |
|   |                             | 7.             | INSIDE AIR FILM     | 0.68    |
|   |                             | TOTAL R-ROOF = |                     | 5.90    |
|   |                             | U=1/R          |                     | 0.170   |
|   |                             |                |                     |         |
| GLASS TYPE:   | SINGLE PANE W/STORM WINDOWS | R-GLASS        | 1.60                |         |
| SLAB TYPE FLOOR:  | CONCRETE                    | SLF            | 0.68                |         |
| BASEMENT TYPE:  | NONE                        | R-BASEM.       | 0.00                |         |
| OVERHEAD DOOR TYPE:   | NONE                        | R-ODOOR        | 0.00                |         |
| PERSONNEL DOOR TYPE:  | WOOD                        | R-PDOOR        | 1.88                |         |

#### III. INFILTRATION:

|                                   |                       |        |                          |              |       |   |     |
|-----------------------------------|-----------------------|--------|--------------------------|--------------|-------|---|-----|
| iii. INFILTRATION.                |                       |        |                          |              |       |   |     |
| WINDOWS (LF of Crack)             | 927 X 0.33 Sq.In./LF= | Sq.In. | 306                      | X CFM/Sq.In. | 1.530 | = | 468 |
| PERSONNEL DOORS (SF)              | 105 X 0.16 Sq.In./SF= | Sq.In. | 17                       | X CFM/Sq.In. | 1.530 | = | 26  |
|                                   |                       |        |                          |              |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM /OPENING /HR       |              | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | X CFM /OPENING /HR       |              | 1.385 | = | 0   |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |              |       | = | 494 |

|              |   |                         |        |                     |       |   |       |
|--------------|---|-------------------------|--------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA              | 0      | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA              | 105    | X DOOR "U"          | 0.532 | = | 56    |
| UA WALL      | = | WALL AREA               | 11,890 | X WALL "U"          | 0.108 | = | 1,278 |
| UA ROOF      | = | ROOF AREA               | 19,533 | X ROOF "U"          | 0.170 | = | 3,313 |
| UA GLASS     | = | GLASS AREA              | 1,665  | X GLASS "U"         | 0.625 | = | 1,041 |
| UA SLAB      | = | SLAB PERIM. CRAWL SPACE |        | X SLF               | 0.680 | = | 0     |
| UA BASEM.    | = | B-WALL AREA             | 0      | X BASE. "U"         | 0.000 | = | 0     |
| INFILTRATION | = | CFM                     | 494    | X A. T. F.          | 0.852 | = | 421   |
|              |   |                         |        | TOTAL UA (BTU/HR°F) |       |   | 6,109 |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                     |        |            |       |
|---------------------|--------|------------|-------|
| BLDG NO:            | 211    | BLDG NAME: | ADMIN |
| BLDG FUNCTION:      | ADMIN  |            |       |
| FLOOR AREA (SQ. FT) | 38,754 | # FLOORS:  | 3     |
| SLAB PERIMETER (FT) | 726    |            |       |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-E | NORTH-W | SOUTH-E | SOUTH-W | TOTAL  |
|---|----------|---------|---------|---------|---------|--------|
| WALLS, GROSS  | (SQ. FT) | 2,432   | 4,465   | 4,465   | 2,432   | 13,794 |
| GLASS   | (SQ. FT) | 608     | 1,040   | 1,152   | 608     | 3,408  |
| PERSONNEL DOOR  | (SQ. FT) | 42      | 84      | 42      | 42      | 210    |
| OVERHEAD DOOR   | (SQ. FT) |         |         |         |         | 0      |
| WALLS, NET  | (SQ. FT) | 1,782   | 3,341   | 3,271   | 1,782   | 10,176 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |         |         |         | 18,392 |
| OVERHEAD DOOR   | (SQ. FT) | 0       |         |         |         | 210    |
| BASEMENT WALLS  | (SQ. FT) | 1,043   | 1,323   | 1,323   | 1,043   | 4,732  |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |                         | COMPONENTS            | R-VALUE |
|---------------------------------------|-------------------------|-----------------------|---------|
|                                       |                         | 1. OUTSIDE AIR FILM   | 0.17    |
|                                       |                         | 2. 18" SANDSTONE      | 1.44    |
|                                       |                         | 3. 1/2" GYPSUM BOARD  | 0.45    |
|                                       |                         | 4. 3/4" WOOD          | 0.83    |
|                                       |                         | 5.                    |         |
|                                       |                         | 6.                    |         |
|                                       |                         | 7. INSIDE AIR FILM    | 0.68    |
|                                       |                         | TOTAL R-WALL =        | 3.57    |
|                                       |                         | U=1/R                 | 0.281   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |                         | COMPONENTS            | R-VALUE |
|                                       |                         | 1. OUTSIDE AIR FILM   | 0.17    |
|                                       |                         | 2. SHINGLES           | 0.44    |
|                                       |                         | 3. 3/4" WOOD          | 0.83    |
|                                       |                         | 4. AIR SPACE          | 1.00    |
|                                       |                         | 5. 3" BATT INSULATION | 11.00   |
|                                       |                         | 6. 1/2" GYPSUM BOARD  | 0.45    |
|                                       |                         | 7. INSIDE AIR FILM    | 0.68    |
|                                       |                         | TOTAL R-ROOF =        | 14.57   |
|                                       |                         | U=1/R                 | 0.069   |
| GLASS TYPE:                           | SINGLE PANE WITH STORMS | R-GLASS               | 1.60    |
| SLAB TYPE FLOOR:                      | CONCRETE                | SLF                   | 0.68    |
| BASEMENT TYPE:                        | NONE                    | R-BASEM.              | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE                    | R-ODOOR               | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL            | R-PDOOR               | 1.81    |

#### III. INFILTRATION:

|                                   |                       |                      |       |              |       |   |     |
|-----------------------------------|-----------------------|----------------------|-------|--------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 616 X 0.27 Sq.In./LF= | Sq.In.               | 166   | X CFM/Sq.In. | 1.530 | = | 254 |
| PERSONNEL DOORS (SF)              | 210 X 0.16 Sq.In./SF= | Sq.In.               | 34    | X CFM/Sq.In. | 1.530 | = | 51  |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       | X CFM / OPENING / HR | 1.600 | =            |       |   | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS | 4                     | X CFM / OPENING / HR | 1.385 | =            |       |   | 6   |
| TOTAL INFILTRATION (CFM)          |                       |                      |       |              |       | = | 311 |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 210    | X DOOR "U"  | 0.552 | = | 116   |
| UA WALL             | = | WALL AREA   | 10,176 | X WALL "U"  | 0.281 | = | 2,854 |
| UA ROOF             | = | ROOF AREA   | 18,392 | X ROOF "U"  | 0.069 | = | 1,263 |
| UA GLASS            | = | GLASS AREA  | 3,408  | X GLASS "U" | 0.625 | = | 2,130 |
| UA SLAB             | = | SLAB PERIM. | 726    | X SLF       | 0.680 | = | 494   |
| UA BASEM.           | = | B-WALL AREA | 4,732  | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 311    | X A. T. F.  | 1.037 | = | 323   |
| TOTAL UA (BTU/HR°F) |   |             |        |             |       |   | 7,180 |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                   |
|----------------------|--------|------------|-------------------|
| BLDG NO:             | 214    | BLDG NAME: | ENL BARRACKS W/AS |
| BLDG FUNCTION:       |        |            |                   |
| FLOOR AREA: (SQ. FT) | 31,662 | # FLOORS:  | 2                 |
| SLAB PERIMETER: (FT) |        |            |                   |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST  | TOTAL  |
|---|----------|-------|----------------|----------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 4,380 | 4,380          | 3,015    | 3,015 | 14,790 |
| GLASS   | (SQ. FT) | 733   | 555            | 746      | 746   | 2,779  |
| PERSONNEL DOOR  | (SQ. FT) | 168   | 210            | 42       | 42    | 462    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0     | 0      |
| WALLS, NET  | (SQ. FT) | 3,479 | 3,616          | 4,815    | 4,815 | 11,550 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |       | 10,554 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) | 462   |        |
| BASEMENT WALLS  | (SQ. FT) | 1,314 | 1,314          | 1,445    | 1,445 | 5,518  |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

II. CONSTRUCTION: ( [ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |                      | COMPONENTS            | R-VALUE |
|---------------------------------------|----------------------|-----------------------|---------|
|                                       |                      | 1. OUTSIDE AIR FILM   | 0.17    |
|                                       |                      | 2. 18" SANDSTONE      | 1.44    |
|                                       |                      | 3. 1/2" GYPSUM BOARD  | 0.45    |
|                                       |                      | 4. 1" AIR SPACE       | 1.00    |
|                                       |                      | 5.                    |         |
|                                       |                      | 6.                    |         |
|                                       |                      | 7. INSIDE AIR FILM    | 0.68    |
|                                       |                      | TOTAL R-WALL =        | 3.74    |
|                                       |                      | U=1/R                 | 0.267   |
|                                       |                      |                       |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |                      | COMPONENTS            | R-VALUE |
|                                       |                      | 1. OUTSIDE AIR FILM   | 0.17    |
|                                       |                      | 2. SHINGLES           | 0.44    |
|                                       |                      | 3. 1/2" GYPSUM BOARD  | 0.45    |
|                                       |                      | 4. AIR SPACE          | 1.00    |
|                                       |                      | 5. 3/4" WOOD          | 0.83    |
|                                       |                      | 6. 6" BATT INSULATION | 19.00   |
|                                       |                      | 7. INSIDE AIR FILM    | 0.68    |
|                                       |                      | TOTAL R-ROOF =        | 22.57   |
|                                       |                      | U=1/R                 | 0.044   |
|                                       |                      |                       |         |
| GLASS TYPE:                           | DOUBLE HUNG W/STORMS | R-GLASS               | 1.60    |
| SLAB TYPE FLOOR:                      | CONCRETE             | SLF                   | 0.68    |
| BASEMENT TYPE:                        | NONE                 | R-BASEM.              | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE                 | R-ODOOR               | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL         | R-PDOOR               | 1.81    |

#### III. INFILTRATION:

|                                   |                       |                      |       |                          |       |     |     |
|-----------------------------------|-----------------------|----------------------|-------|--------------------------|-------|-----|-----|
| WINDOWS (LF of Crack)             | 756 X 0.27 Sq.In./LF= | Sq.In.               | 204   | X CFM/Sq.In.             | 1.530 | =   | 312 |
| PERSONNEL DOORS (SF)              | 462 X 0.16 Sq.In./SF= | Sq.In.               | 74    | X CFM/Sq.In.             | 1.530 | =   | 113 |
|                                   |                       |                      |       |                          |       |     |     |
| DOOR OPENINGS / HR - SINGLE DOOR  | 8                     | X CFM / OPENING / HR | 1.600 | =                        | 13    |     |     |
| DOOR OPENINGS / HR - DOUBLE DOORS | 2                     | X CFM / OPENING / HR | 1.385 | =                        | 3     |     |     |
|                                   |                       |                      |       | TOTAL INFILTRATION (CFM) | =     | 441 |     |

|              |   |             |        |                     |       |       |       |
|--------------|---|-------------|--------|---------------------|-------|-------|-------|
| UA ODOOR     | = | ODOOR AREA  | 0      | X DOOR "U"          | 0.000 | =     | 0     |
| UA PDOOR     | = | PDOOR AREA  | 462    | X DOOR "U"          | 0.552 | =     | 255   |
| UA WALL      | = | WALL AREA   | 11,550 | X WALL "U"          | 0.267 | =     | 3,088 |
| UA ROOF      | = | ROOF AREA   | 10,554 | X ROOF "U"          | 0.044 | =     | 468   |
| UA GLASS     | = | GLASS AREA  | 2,779  | X GLASS "U"         | 0.625 | =     | 1,737 |
| UA SLAB      | = | SLAB PERIM. | 0      | X SLF               | 0.680 | =     | 0     |
| UA BASEM.    | = | B-WALL AREA | 5,518  | X BASE. "U"         | 0.000 | =     | 0     |
| INFILTRATION | = | CFM         | 441    | X A. T. F.          | 1.037 | =     | 457   |
|              |   |             |        | TOTAL UA (BTU/HR°F) | =     | 6,005 |       |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                    |
|----------------------|--------|------------|--------------------|
| BLDG NO:             | 223    | BLDG NAME: | ENL BARRACKS W/DAS |
| BLDG FUNCTION:       |        |            |                    |
| FLOOR AREA: (SQ. FT) | 37,428 | # FLOORS:  | 2                  |
| SLAB PERIMETER: (FT) |        |            |                    |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST  | TOTAL  |
|---|----------|-------|----------------|----------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 5,712 | 5,712          | 3,504    | 3,504 | 18,432 |
| GLASS   | (SQ. FT) | 1,227 | 1,029          | 240      | 249   | 2,745  |
| PERSONNEL DOOR  | (SQ. FT) | 84    | 147            | 189      | 189   | 609    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0     | 0      |
| WALLS, NET  | (SQ. FT) | 4,401 | 4,536          | 3,075    | 3,066 | 15,078 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |       | 12,476 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) | 609   |        |
| BASEMENT WALLS  | (SQ. FT) | 2,142 | 2,142          | 1,314    | 1,314 | 6,912  |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |                      | COMPONENTS            | R-VALUE |
|---------------------------------------|----------------------|-----------------------|---------|
|                                       |                      | 1. OUTSIDE AIR FILM   | 0.17    |
|                                       |                      | 2. 16" SANDSTONE      | 1.28    |
|                                       |                      | 3. AIR SPACE          | 1.00    |
|                                       |                      | 4. 1/2" GYPSUM BOARD  | 0.45    |
|                                       |                      | 5.                    |         |
|                                       |                      | 6.                    |         |
|                                       |                      | 7. INSIDE AIR FILM    | 0.68    |
|                                       |                      | TOTAL R-WALL =        | 3.58    |
|                                       |                      | U=1/R                 | 0.279   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |                      | COMPONENTS            | R-VALUE |
|                                       |                      | 1. OUTSIDE AIR FILM   | 0.17    |
|                                       |                      | 2. SHINGLES           | 0.44    |
|                                       |                      | 3. 3/4" WOOD          | 0.83    |
|                                       |                      | 4. AIR SPACE          | 1.00    |
|                                       |                      | 5. 6" BATT INSULATION | 19.00   |
|                                       |                      | 6. 1/2" GYPSUM BOARD  | 0.45    |
|                                       |                      | 7. INSIDE AIR FILM    | 0.68    |
|                                       |                      | TOTAL R-ROOF =        | 22.57   |
|                                       |                      | U=1/R                 | 0.044   |
| GLASS TYPE:                           | SINGLE PANE W/STORMS | R-GLASS               | 1.60    |
| SLAB TYPE FLOOR:                      | CONCRETE             | SLF                   | 0.68    |
| BASEMENT TYPE:                        | NONE                 | R-BASEM.              | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE                 | R-ODOOR               | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL         | R-PDOOR               | 1.81    |

#### III. INFILTRATION:

|                                   |                        |                      |       |              |       |   |     |
|-----------------------------------|------------------------|----------------------|-------|--------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 1209 X 0.33 Sq.In./LF= | Sq.In.               | 399   | X CFM/Sq.In. | 1.530 | = | 610 |
| PERSONNEL DOORS (SF)              | 609 X 0.16 Sq.In./SF=  | Sq.In.               | 97    | X CFM/Sq.In. | 1.530 | = | 149 |
| DOOR OPENINGS / HR - SINGLE DOOR  | 8                      | X CFM / OPENING / HR | 1.600 | =            | 13    |   |     |
| DOOR OPENINGS / HR - DOUBLE DOORS | 4                      | X CFM / OPENING / HR | 1.385 | =            | 6     |   |     |
| TOTAL INFILTRATION (CFM)          |                        |                      |       | =            | 778   |   |     |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 609    | X DOOR "U"  | 0.552 | = | 336   |
| UA WALL             | = | WALL AREA   | 15,078 | X WALL "U"  | 0.279 | = | 4,212 |
| UA ROOF             | = | ROOF AREA   | 12,476 | X ROOF "U"  | 0.044 | = | 553   |
| UA GLASS            | = | GLASS AREA  | 2,745  | X GLASS "U" | 0.625 | = | 1,716 |
| UA SLAB             | = | SLAB PERIM. | 0      | X SLF       | 0.680 | = | 0     |
| UA BASEM.           | = | B-WALL AREA | 6,912  | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 778    | X A. T. F.  | 1.037 | = | 807   |
| TOTAL UA (BTU/HR°F) |   |             |        |             |       |   | 7,623 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |               |
|----------------------|--------|------------|---------------|
| BLDG NO:             | 302    | BLDG NAME: | ADM & FINANCE |
| BLDG FUNCTION:       |        |            |               |
| FLOOR AREA: (SQ. FT) | 16,500 | # FLOORS:  | 3             |
| SLAB PERIMETER: (FT) |        |            |               |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH | EAST           | WEST     | TOTAL |
|---|----------|-------|-------|----------------|----------|-------|
| WALLS, GROSS  | (SQ. FT) | 1,116 | 1,116 | 2,625          | 2,625    | 7,482 |
| GLASS   | (SQ. FT) | 156   | 96    | 240            | 72       | 564   |
| PERSONNEL DOOR  | (SQ. FT) | 0     | 0     | 105            | 105      | 210   |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0     | 0              | 0        | 0     |
| WALLS, NET  | (SQ. FT) | 960   | 1,020 | 2,280          | 2,448    | 6,708 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |       |                |          | 9,500 |
| OVERHEAD DOOR   | (SQ. FT) | 0     |       | PERSONNEL DOOR | (SQ. FT) | 210   |
| BASEMENT WALLS  | (SQ. FT) | 500   | 500   | 176            | 176      | 1,352 |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

II. CONSTRUCTION: ( ) FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPE

| WALLS: (SKETCH CROSS SECTION OF WALL) |                      | COMPONENTS             | R-VALUE |       |
|---------------------------------------|----------------------|------------------------|---------|-------|
|                                       |                      | 1. OUTSIDE AIR FILM    | 0.17    |       |
|                                       |                      | 2. 18" SANDSTONE BLOCK | 1.44    |       |
|                                       |                      | 3. AIR SPACE           | 1.00    |       |
|                                       |                      | 4. 1" RIGID INSULATION | 2.78    |       |
|                                       |                      | 5. 1/2" GYPSUM BOARD   | 0.45    |       |
|                                       |                      | 6.                     |         |       |
|                                       |                      | 7. INSIDE AIR FILM     | 0.68    |       |
|                                       |                      | TOTAL R-WALL =         |         | 6.52  |
|                                       |                      | U=1/R                  |         | 0.153 |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |                      | COMPONENTS             | R-VALUE |       |
|                                       |                      | 1. OUTSIDE AIR FILM    | 0.17    |       |
|                                       |                      | 2. ASPHALT SHINGLES    | 0.44    |       |
|                                       |                      | 3. 3/4" WOOD           | 0.83    |       |
|                                       |                      | 4. 1" RIGID INSULATION | 2.78    |       |
|                                       |                      | 5. 1/2" GYPSUM BOARD   | 0.45    |       |
|                                       |                      | 6.                     |         |       |
|                                       |                      | 7. INSIDE AIR FILM     | 0.68    |       |
|                                       |                      | TOTAL R-ROOF =         |         | 5.35  |
|                                       |                      | U=1/R                  |         | 0.187 |
| GLASS TYPE:                           | SINGLE PANE W/STORMS | R-GLASS                | 1.60    |       |
| SLAB TYPE FLOOR:                      | CONCRETE             | SLF                    | 0.68    |       |
| BASEMENT TYPE:                        | NONE                 | R-BASEM.               | 0.00    |       |
| OVERHEAD DOOR TYPE:                   | NONE                 | R-ODOOR                | 0.00    |       |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL         | R-PDOOR                | 1.81    |       |

#### III. INFILTRATION:

|                                   |                       |                      |       |              |       |   |     |
|-----------------------------------|-----------------------|----------------------|-------|--------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 322 X 0.33 Sq.In./LF= | Sq.In.               | 106   | X CFM/Sq.In. | 1.530 | = | 163 |
| PERSONNEL DOORS (SF)              | 210 X 0.16 Sq.In./SF= | Sq.In.               | 34    | X CFM/Sq.In. | 1.530 | = | 51  |
|                                   |                       |                      |       |              |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  | 4                     | X CFM / OPENING / HR | 1.600 | =            | 6     |   |     |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       | X CFM / OPENING / HR | 1.385 | =            | 0     |   |     |
| TOTAL INFILTRATION (CFM)          |                       |                      |       | =            | 220   |   |     |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 210   | X DOOR "U"  | 0.552 | = | 116   |
| UA WALL             | = | WALL AREA   | 6,708 | X WALL "U"  | 0.153 | = | 1,029 |
| UA ROOF             | = | ROOF AREA   | 9,500 | X ROOF "U"  | 0.187 | = | 1,777 |
| UA GLASS            | = | GLASS AREA  | 564   | X GLASS "U" | 0.625 | = | 353   |
| UA SLAB             | = | SLAB PERIM. | 0     | X SLF       | 0.680 | = | 0     |
| UA BASEM.           | = | B-WALL AREA | 1,352 | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 220   | X A. T. F.  | 1.037 | = | 229   |
| TOTAL UA (BTU/HR°F) |   |             |       |             |       |   | 3,503 |



E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |               |
|----------------------|-------|------------|---------------|
| BLDG NO:             | 313   | BLDG NAME: | CIV PERS BLDG |
| BLDG FUNCTION:       |       |            |               |
| FLOOR AREA: (SQ. FT) | 6,000 | # FLOORS:  | 1             |
| SLAB PERIMETER: (FT) | 380   |            |               |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W | SOUTH-E  | TOTAL |
|---|----------|---------|----------------|---------|----------|-------|
| WALLS, GROSS  | (SQ. FT) | 1,500   | 400            | 1,500   | 400      | 3,800 |
| GLASS   | (SQ. FT) | 180     | 30             | 30      | 195      | 435   |
| PERSONNEL DOOR  | (SQ. FT) | 0       | 21             | 21      | 42       | 84    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0       | 0        | 0     |
| WALLS, NET  | (SQ. FT) | 1,320   | 349            | 1,449   | 163      | 3,281 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |         |          | 6,000 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR |         | (SQ. FT) | 84    |
| BASEMENT WALLS  | (SQ. FT) |         |                |         |          | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |                      | COMPONENTS       | R-VALUE |
|---------------------------------------|----------------------|------------------|---------|
|                                       | 1.                   | OUTSIDE AIR FILM | 0.17    |
|                                       | 2.                   | 4" BRICK         | 1.20    |
|                                       | 3.                   | 1" AIR SPACE     | 1.00    |
|                                       | 4.                   | 8" CMU           | 1.11    |
|                                       | 5.                   |                  |         |
|                                       | 6.                   |                  |         |
|                                       | 7.                   | INSIDE AIR FILM  | 0.68    |
|                                       |                      | TOTAL R-WALL =   | 4.16    |
|                                       |                      | U=1/R            | 0.240   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |                      | COMPONENTS       | R-VALUE |
|                                       | 1.                   | OUTSIDE AIR FILM | 0.17    |
|                                       | 2.                   | ASPHALT SHINGLES | 0.44    |
|                                       | 3.                   | WOOD BASE        | 0.56    |
|                                       | 4.                   | AIR SPACE        | 1.00    |
|                                       | 5.                   | 3" BATT INSUL    | 11.00   |
|                                       | 6.                   |                  |         |
|                                       | 7.                   | INSIDE AIR FILM  | 0.68    |
|                                       |                      | TOTAL R-ROOF =   | 13.85   |
|                                       |                      | U=1/R            | 0.072   |
| GLASS TYPE:                           | SINGLE PANE W/STORMS | R-GLASS          | 1.60    |
| SLAB TYPE FLOOR:                      | CONCRETE             | SLF              | 0.68    |
| BASEMENT TYPE:                        | NONE                 | R-BASEM.         | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE                 | R-ODOOR          | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL         | R-PDOOR          | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                          |              |       |   |     |
|-----------------------------------|-----------------------|--------|--------------------------|--------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 232 X 0.33 Sq.In./LF= | Sq.In. | 77                       | X CFM/Sq.In. | 1.530 | = | 117 |
| PERSONNEL DOORS (SF)              | 84 X 0.16 Sq.In./SF=  | Sq.In. | 13                       | X CFM/Sq.In. | 1.530 | = | 21  |
|                                   |                       |        |                          |              |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM /OPENING /HR       |              | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | X CFM /OPENING /HR       |              | 1.385 | = | 0   |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |              |       | = | 138 |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 84    | X DOOR "U"  | 0.552 | = | 46    |
| UA WALL             | = | WALL AREA   | 3,281 | X WALL "U"  | 0.240 | = | 789   |
| UA ROOF             | = | ROOF AREA   | 6,000 | X ROOF "U"  | 0.072 | = | 433   |
| UA GLASS            | = | GLASS AREA  | 435   | X GLASS "U" | 0.625 | = | 272   |
| UA SLAB             | = | SLAB PERIM. | 380   | X SLF       | 0.680 | = | 258   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE "U"  | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 138   | X A. T. F.  | 1.037 | = | 143   |
| TOTAL UA (BTU/HR°F) |   |             |       |             |       |   | 1,941 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 18-Jul-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |                      |
|----------------------|-------|------------|----------------------|
| BLDG NO:             | 319   | BLDG NAME: | GEN INSTRUCTION BLDG |
| BLDG FUNCTION:       |       |            |                      |
| FLOOR AREA: (SQ. FT) | 9,600 | # FLOORS:  | 1                    |
| SLAB PERIMETER: (FT) | 440   |            |                      |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL |
|---|----------|---------|----------------|----------|---------|-------|
| WALLS, GROSS  | (SQ. FT) | 1,920   | 720            | 720      | 1,920   | 5,280 |
| GLASS   | (SQ. FT) | 245     | 77             | 80       | 220     | 622   |
| PERSONNEL DOOR  | (SQ. FT) | 0       | 42             | 42       | 21      | 105   |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0     |
| WALLS, NET  | (SQ. FT) | 1,675   | 601            | 598      | 1,679   | 4,554 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 9,600 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) |         | 105   |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|  |              |                      |         |
|--|--------------|----------------------|---------|
| II. CONSTRUCTION: (FIELD VERIFIED WALL, ROOF, WINDOW, DOOR, ET AL) |              |                      |         |
| WALLS: (SKETCH CROSS SECTION OF WALL)                              |              | COMPONENTS           | R-VALUE |
|  |              | 1. OUTSIDE AIR FILM  | 0.17    |
|  |              | 2. 4" BRICK          | 1.20    |
|  |              | 3. AIR SPACE         | 1.00    |
|  |              | 4. 1/2" GYPSUM BOARD | 0.45    |
|  |              | 5.                   |         |
|  |              | 6.                   |         |
|  |              | 7. INSIDE AIR FILM   | 0.68    |
|  |              | TOTAL R-WALL =       |         |
| U=1/R  |              | 0.286                |         |
|  |              |                      |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                               |              | COMPONENTS           | R-VALUE |
|  |              | 1. OUTSIDE AIR FILM  | 0.17    |
|  |              | 2. STEEL DECK        | 0.00    |
|  |              | 3. AIR SPACE         | 1.00    |
|  |              | 4. 12" FIBERGLASS    | 38.00   |
|  |              | 5. PLASTER CEILING   | 0.63    |
|  |              | 6.                   |         |
|  |              | 7. INSIDE AIR FILM   | 0.68    |
|  |              | TOTAL R-ROOF =       |         |
| U=1/R  |              | 0.025                |         |
|  |              |                      |         |
| GLASS TYPE:  | SINGLE PANE  | R-GLASS              | 0.90    |
| SLAB TYPE FLOOR:   | CONCRETE     | SLF                  | 0.68    |
| BASEMENT TYPE:   | NONE         | R-BASEM.             | 0.00    |
| OVERHEAD DOOR TYPE:  | NONE         | R-ODOOR              | 0.00    |
| PERSONNEL DOOR TYPE:   | HOLLOW METAL | R-PDOOR              | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |    |                          |       |   |     |
|-----------------------------------|-----------------------|--------|----|--------------------------|-------|---|-----|
| iii. INFILTRATION:                |                       |        |    |                          |       |   |     |
| WINDOWS (LF of Crack)             | 220 X 0.33 Sq.In./LF= | Sq.In. | 73 | X CFM/Sq.In.             | 1.530 | = | 111 |
| PERSONNEL DOORS (SF)              | 105 X 0.16 Sq.In./SF= | Sq.In. | 17 | X CFM/Sq.In.             | 1.530 | = | 26  |
|                                   |                       |        |    |                          |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        |    | X CFM /OPENING /HR       | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        |    | X CFM /OPENING /HR       | 1.385 | = | 0   |
|                                   |                       |        |    | TOTAL INFILTRATION (CFM) |       | = | 137 |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 105   | X DOOR "U"  | 0.552 | = | 58    |
| UA WALL             | = | WALL AREA   | 4,554 | X WALL "U"  | 0.286 | = | 1,301 |
| UA ROOF             | = | ROOF AREA   | 9,600 | X ROOF "U"  | 0.025 | = | 237   |
| UA GLASS            | = | GLASS AREA  | 622   | X GLASS "U" | 1.111 | = | 691   |
| UA SLAB             | = | SLAB PERIM. | 440   | X SLF       | 0.680 | = | 299   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 137   | X A. T. F.  | 0.852 | = | 117   |
| TOTAL UA (BTU/HR°F) |   |             |       |             |       |   | 2,702 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |           |
|----------------------|--------|------------|-----------|
| BLDG NO:             | 330    | BLDG NAME: | DEH ADMIN |
| BLDG FUNCTION:       |        |            |           |
| FLOOR AREA: (SQ. FT) | 14,126 | # FLOORS:  | 3         |
| SLAB PERIMETER: (FT) |        |            |           |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL  |
|---|----------|---------|----------------|----------|---------|--------|
| WALLS, GROSS  | (SQ. FT) | 989     | 2,519          | 2,519    | 989     | 7,015  |
| GLASS   | (SQ. FT) | 82      | 267            | 297      | 82      | 728    |
| PERSONNEL DOOR  | (SQ. FT) | 0       | 42             | 63       | 0       | 105    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0      |
| WALLS, NET  | (SQ. FT) | 907     | 2,210          | 2,159    | 907     | 6,182  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 14,126 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) |         | 105    |
| BASEMENT WALLS  | (SQ. FT) | 172     | 438            | 438      | 172     | 1,220  |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |                      | COMPONENTS        | R-VALUE |
|---------------------------------------|----------------------|-------------------|---------|
|                                       | 1.                   | OUTSIDE AIR FILM  | 0.17    |
|                                       | 2.                   | 18" SANDSTONE     | 1.44    |
|                                       | 3.                   | AIR SPACE         | 1.00    |
|                                       | 4.                   | 1/2" GYPSUM BOARD | 0.45    |
|                                       | 5.                   |                   |         |
|                                       | 6.                   |                   |         |
|                                       | 7.                   | INSIDE AIR FILM   | 0.68    |
|                                       |                      | TOTAL R-WALL =    | 3.74    |
|                                       |                      | U=1/R             | 0.267   |
|                                       |                      |                   |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |                      | COMPONENTS        | R-VALUE |
|                                       | 1.                   | OUTSIDE AIR FILM  | 0.17    |
|                                       | 2.                   | SHINGLES          | 0.44    |
|                                       | 3.                   | 3/4" WOOD         | 0.83    |
|                                       | 4.                   | AIR SPACE         | 1.00    |
|                                       | 5.                   | 6" BLANKET INSUL  | 9.00    |
|                                       | 6.                   | 1/2" GYPUSM BOARD | 0.45    |
|                                       | 7.                   | INSIDE AIR FILM   | 0.68    |
|                                       |                      | TOTAL R-ROOF =    | 12.57   |
|                                       |                      | U=1/R             | 0.080   |
|                                       |                      |                   |         |
| GLASS TYPE:                           | SINGLE PANE W/STORMS | R-GLASS           | 1.60    |
| SLAB TYPE FLOOR:                      | CONCRETE             | SLF               | 0.68    |
| BASEMENT TYPE:                        | NONE                 | R-BASEM.          | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE                 | R-ODOOR           | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL         | R-PDOOR           | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                          |                      |       |   |     |
|-----------------------------------|-----------------------|--------|--------------------------|----------------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 369 X 0.33 Sq.In./LF= | Sq.In. | 122                      | X CFM/Sq.In.         | 1.530 | = | 186 |
| PERSONNEL DOORS (SF)              | 105 X 0.16 Sq.In./SF= | Sq.In. | 17                       | X CFM/Sq.In.         | 1.530 | = | 26  |
|                                   |                       |        |                          |                      |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        |                          | X CFM / OPENING / HR | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS | 4                     |        |                          | X CFM / OPENING / HR | 1.385 | = | 6   |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |                      |       | = | 217 |

|              |   |             |        |                     |       |       |       |
|--------------|---|-------------|--------|---------------------|-------|-------|-------|
| UA ODOOR     | = | ODOOR AREA  | 0      | X DOOR "U"          | 0.000 | =     | 0     |
| UA PDOOR     | = | PDOOR AREA  | 105    | X DOOR "U"          | 0.552 | =     | 58    |
| UA WALL      | = | WALL AREA   | 6,182  | X WALL "U"          | 0.267 | =     | 1,653 |
| UA ROOF      | = | ROOF AREA   | 14,126 | X ROOF "U"          | 0.080 | =     | 1,124 |
| UA GLASS     | = | GLASS AREA  | 728    | X GLASS "U"         | 0.625 | =     | 455   |
| UA SLAB      | = | SLAB PERIM. | 0      | X SLF               | 0.680 | =     | 0     |
| UA BASEM.    | = | B-WALL AREA | 1,220  | X BASE. "U"         | 0.000 | =     | 0     |
| INFILTRATION | = | CFM         | 217    | X A. T. F.          | 1.037 | =     | 225   |
|              |   |             |        | TOTAL UA (BTU/HR*F) |       | 3,515 |       |

E M C ENGINEERS, INC.  
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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |     |            |          |
|----------------------|-----|------------|----------|
| BLDG NO:             | 364 | BLDG NAME: | UEMCS HQ |
| BLDG FUNCTION:       |     |            |          |
| FLOOR AREA: (SQ. FT) | 760 | # FLOORS:  | 1        |
| SLAB PERIMETER: (FT) | 118 |            |          |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST | TOTAL |
|---|----------|-------|----------------|----------|------|-------|
| WALLS, GROSS  | (SQ. FT) | 360   | 360            | 171      | 171  | 1,062 |
| GLASS   | (SQ. FT) | 50    | 37             | 0        | 0    | 87    |
| PERSONNEL DOOR  | (SQ. FT) | 21    | 0              | 0        | 0    | 21    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0    | 0     |
| WALLS, NET  | (SQ. FT) | 289   | 323            | 171      | 171  | 954   |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |      | 760   |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) | 21   |       |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |      | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

II. CONSTRUCTION: ( [ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |                      | COMPONENTS          | R-VALUE |
|---------------------------------------|----------------------|---------------------|---------|
|                                       | 1.                   | OUTSIDE AIR FILM    | 0.17    |
|                                       | 2.                   | 18" SANDSTONE BLOCK | 1.44    |
|                                       | 3.                   | AIR SPACE           | 1.00    |
|                                       | 4.                   | 1/2" GYPSUM BOARD   | 0.45    |
|                                       | 5.                   |                     |         |
|                                       | 6.                   |                     |         |
|                                       | 7.                   | INSIDE AIR FILM     | 0.68    |
|                                       |                      | TOTAL R-WALL =      | 3.74    |
|                                       |                      | U=1/R               | 0.267   |
|                                       |                      |                     |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |                      | COMPONENTS          | R-VALUE |
|                                       | 1.                   | OUTSIDE AIR FILM    | 0.17    |
|                                       | 2.                   | SHINGLES            | 0.44    |
|                                       | 3.                   | 3/4" WOOD           | 0.83    |
|                                       | 4.                   | AIR SPACE           | 1.00    |
|                                       | 5.                   | 1/2" GYPSUM BOARD   | 0.45    |
|                                       | 6.                   |                     |         |
|                                       | 7.                   | INSIDE AIR FILM     | 0.68    |
|                                       |                      | TOTAL R-ROOF =      | 3.57    |
|                                       |                      | U=1/R               | 0.281   |
|                                       |                      |                     |         |
| GLASS TYPE:                           | SINGLE PANE W/STORMS | R-GLASS             | 1.60    |
| SLAB TYPE FLOOR:                      | CONCRETE             | SLF                 | 0.68    |
| BASEMENT TYPE:                        | NONE                 | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE                 | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL         | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                          |              |       |    |    |
|-----------------------------------|-----------------------|--------|--------------------------|--------------|-------|----|----|
| III. INFILTRATION:                |                       |        |                          |              |       |    |    |
| WINDOWS (LF of Crack)             | 105 X 0.33 Sq.In./LF= | Sq.In. | 35                       | X CFM/Sq.In. | 1.530 | =  | 53 |
| PERSONNEL DOORS (SF)              | 21 X 0.16 Sq.In./SF=  | Sq.In. | 3                        | X CFM/Sq.In. | 1.530 | =  | 5  |
|                                   |                       |        |                          |              |       |    |    |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM /OPENING /HR       | 1.600        | =     | 0  |    |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | 1 X CFM /OPENING /HR     | 1.385        | =     | 1  |    |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |              | =     | 60 |    |

|              |   |             |     |                     |       |   |     |
|--------------|---|-------------|-----|---------------------|-------|---|-----|
| UA ODOOR     | = | ODOOR AREA  | 0   | X DOOR "U"          | 0.000 | = | 0   |
| UA PDOOR     | = | PDOOR AREA  | 21  | X DOOR "U"          | 0.552 | = | 12  |
| UA WALL      | = | WALL AREA   | 954 | X WALL "U"          | 0.267 | = | 255 |
| UA ROOF      | = | ROOF AREA   | 760 | X ROOF "U"          | 0.281 | = | 213 |
| UA GLASS     | = | GLASS AREA  | 87  | X GLASS "U"         | 0.625 | = | 54  |
| UA SLAB      | = | SLAB PERIM. | 118 | X SLF               | 0.680 | = | 80  |
| UA BASEM.    | = | B-WALL AREA | 0   | X BASE. "U"         | 0.000 | = | 0   |
| INFILTRATION | = | CFM         | 60  | X A. T. F.          | 1.037 | = | 62  |
|              |   |             |     | TOTAL UA (BTU/HR*F) |       |   |     |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                |
|----------------------|--------|------------|----------------|
| BLDG NO:             | 405    | BLDG NAME: | ADMIN GEN PURP |
| BLDG FUNCTION:       |        |            |                |
| FLOOR AREA: (SQ. FT) | 11,104 | # FLOORS:  | 2              |
| SLAB PERIMETER: (FT) |        |            |                |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL |
|---|----------|---------|----------------|----------|---------|-------|
| WALLS, GROSS  | (SQ. FT) | 2,340   | 1,430          | 1,430    | 2,700   | 7,900 |
| GLASS   | (SQ. FT) | 156     | 90             | 180      | 360     | 786   |
| PERSONNEL DOOR  | (SQ. FT) | 42      | 42             | 21       | 63      | 168   |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0     |
| WALLS, NET  | (SQ. FT) | 2,142   | 1,298          | 1,229    | 2,277   | 6,946 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 4,950 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) | 168     |       |
| BASEMENT WALLS  | (SQ. FT) | 450     | 275            | 275      | 450     | 1,450 |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |                       | COMPONENTS             | R-VALUE |
|---------------------------------------|-----------------------|------------------------|---------|
|                                       |                       | 1. OUTSIDE AIR FILM    | 0.17    |
|                                       |                       | 2. 18" SANDSTONE BLOCK | 1.44    |
|                                       |                       | 3. AIR SPACE           | 1.00    |
|                                       |                       | 4. 1/2" GYPSUM BOARD   | 0.45    |
|                                       |                       | 5.                     |         |
|                                       |                       | 6.                     |         |
|                                       |                       | 7. INSIDE AIR FILM     | 0.68    |
|                                       |                       | TOTAL R-WALL =         | 3.74    |
|                                       |                       | U=1/R                  | 0.267   |
|                                       |                       |                        |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |                       | COMPONENTS             | R-VALUE |
|                                       |                       | 1. OUTSIDE AIR FILM    | 0.17    |
|                                       |                       | 2. SHINGLES            | 0.44    |
|                                       |                       | 3. 3/4" WOOD           | 0.83    |
|                                       |                       | 4. AIR SPACE           | 1.00    |
|                                       |                       | 5. 3" BATT INSULATION  | 11.00   |
|                                       |                       | 6. 1/2" GYPSUM BOARD   | 0.45    |
|                                       |                       | 7. INSIDE AIR FILM     | 0.68    |
|                                       |                       | TOTAL R-ROOF =         | 14.57   |
|                                       |                       | U=1/R                  | 0.069   |
|                                       |                       |                        |         |
| GLASS TYPE:                           | SINGLE PANE W/ STORMS | R-GLASS                | 1.60    |
| SLAB TYPE FLOOR:                      | CONCRETE              | SLF                    | 0.68    |
| BASEMENT TYPE:                        | NONE                  | R-BASEM.               | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE                  | R-ODOOR                | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL          | R-PDOOR                | 1.81    |

#### III. INFILTRATION:

|                                   |                       |                      |       |                          |       |   |     |
|-----------------------------------|-----------------------|----------------------|-------|--------------------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 337 X 0.33 Sq.In./LF= | Sq.In.               | 111   | X CFM/Sq.In.             | 1.530 | = | 170 |
| PERSONNEL DOORS (SF)              | 168 X 0.16 Sq.In./SF= | Sq.In.               | 27    | X CFM/Sq.In.             | 1.530 | = | 41  |
| DOOR OPENINGS / HR - SINGLE DOOR  | 2                     | X CFM / OPENING / HR | 1.600 | =                        | 3     |   |     |
| DOOR OPENINGS / HR - DOUBLE DOORS | 6                     | X CFM / OPENING / HR | 1.385 | =                        | 8     |   |     |
|                                   |                       |                      |       | TOTAL INFILTRATION (CFM) |       | = | 223 |

|              |   |             |       |                     |       |   |       |
|--------------|---|-------------|-------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 0     | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 168   | X DOOR "U"          | 0.552 | = | 93    |
| UA WALL      | = | WALL AREA   | 6,946 | X WALL "U"          | 0.267 | = | 1,857 |
| UA ROOF      | = | ROOF AREA   | 4,950 | X ROOF "U"          | 0.069 | = | 340   |
| UA GLASS     | = | GLASS AREA  | 786   | X GLASS "U"         | 0.625 | = | 491   |
| UA SLAB      | = | SLAB PERIM. | 0     | X SLF               | 0.680 | = | 0     |
| UA BASEM.    | = | B-WALL AREA | 1,450 | X BASE. "U"         | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 223   | X A. T. F.          | 1.037 | = | 231   |
|              |   |             |       | TOTAL UA (BTU/HR°F) |       |   | 3,012 |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |          |
|----------------------|--------|------------|----------|
| BLDG NO:             | 406    | BLDG NAME: | CID BLDG |
| BLDG FUNCTION:       |        |            |          |
| FLOOR AREA: (SQ. FT) | 10,219 | # FLOORS:  | 3        |
| SLAB PERIMETER: (FT) | 0      |            |          |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL |
|---|----------|---------|----------------|----------|---------|-------|
| WALLS, GROSS  | (SQ. FT) | 2,520   | 1,218          | 1,218    | 2,520   | 7,476 |
| GLASS   | (SQ. FT) | 132     | 72             | 72       | 180     | 456   |
| PERSONNEL DOOR  | (SQ. FT) | 42      | 21             | 21       | 42      | 126   |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0     |
| WALLS, NET  | (SQ. FT) | 2,346   | 1,125          | 1,125    | 2,298   | 6,894 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 2,703 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) | 126     |       |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 8,195 |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|   |    |                     |         |
|---|----|---------------------|---------|
| II. CONSTRUCTION: ( [     ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES ) |    |                     |         |
| WALLS: (SKETCH CROSS SECTION OF WALL)                                       |    | COMPONENTS          | R-VALUE |
|   | 1. | OUTSIDE AIR FILM    | 0.17    |
|   | 2. | 18" SANDSTONE BLOCK | 1.44    |
|   | 3. | 1" AIR SPACE        | 1.00    |
|   | 4. | 1/2" GYPSUM BOARD   | 0.45    |
|   | 5. |                     |         |
|   | 6. |                     |         |
|   | 7. | INSIDE AIR FILM     | 0.68    |
|   |    | TOTAL R-WALL =      | 3.74    |
|   |    | U=1/R               | 0.267   |
|   |    |                     |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |    | COMPONENTS          | R-VALUE |
|   | 1. | OUTSIDE AIR FILM    | 0.17    |
|   | 2. | ASPHALT SHINGLES    | 0.44    |
|   | 3. | 3/4" WOOD           | 0.83    |
|   | 4. | AIR SPACE           | 1.00    |
|   | 5. | 3" BATT INSULATION  | 11.00   |
|   | 6. | 0.625" PLASTER      | 0.39    |
|   | 7. | ACOUSTIC TILE       | 1.79    |
|   |    | INSIDE AIR FILM     | 0.68    |
|   |    | TOTAL R-ROOF =      | 16.30   |
|   |    | U=1/R               | 0.061   |
| GLASS TYPE: SINGLE PANE IN ALUM. FRAMES W/STORM WINDOWS                     |    | R-GLASS             | 1.60    |
| SLAB TYPE FLOOR: CONCRETE   |    | SLF                 | 0.68    |
| BASEMENT TYPE: CONCRETE   |    | R-BASEM.            | 10.00   |
| OVERHEAD DOOR TYPE: NONE  |    | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE: HOLLOW METAL   |    | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                       |                      |       |                          |       |   |     |
|-----------------------------------|-----------------------|----------------------|-------|--------------------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 396 X 0.27 Sq.In./LF= | Sq.In.               | 107   | X CFM/Sq.In.             | 1.530 | = | 164 |
| PERSONNEL DOORS (SF)              | 126 X 0.16 Sq.In./SF= | Sq.In.               | 20    | X CFM/Sq.In.             | 1.530 | = | 31  |
| DOOR OPENINGS / HR - SINGLE DOOR  | 1                     | X CFM / OPENING / HR | 1.600 | =                        | 2     |   |     |
| DOOR OPENINGS / HR - DOUBLE DOORS | 2                     | X CFM / OPENING / HR | 1.385 | =                        | 3     |   |     |
|                                   |                       |                      |       | TOTAL INFILTRATION (CFM) |       |   |     |
|                                   |                       |                      |       |                          |       |   |     |

|              |   |             |       |                     |       |   |       |
|--------------|---|-------------|-------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 0     | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 126   | X DOOR "U"          | 0.552 | = | 70    |
| UA WALL      | = | WALL AREA   | 6,894 | X WALL "U"          | 0.267 | = | 1,843 |
| UA ROOF      | = | ROOF AREA   | 2,703 | X ROOF "U"          | 0.061 | = | 166   |
| UA GLASS     | = | GLASS AREA  | 456   | X GLASS "U"         | 0.625 | = | 285   |
| UA SLAB      | = | SLAB PERIM. | 0     | X SLF               | 0.680 | = | 0     |
| UA BASEM.    | = | B-WALL AREA | 8,195 | X BASE. "U"         | 0.100 | = | 820   |
| INFILTRATION | = | CFM         | 199   | X A. T. F.          | 1.037 | = | 206   |
|              |   |             |       | TOTAL UA (BTU/HR°F) |       |   |       |
|              |   |             |       |                     |       |   |       |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                |
|----------------------|--------|------------|----------------|
| BLDG NO:             | 540    | BLDG NAME: | OFF QTRS MILIT |
| BLDG FUNCTION:       |        |            |                |
| FLOOR AREA: (SQ. FT) | 14,186 | # FLOORS:  | 2              |
| SLAB PERIMETER: (FT) | 435    |            |                |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST  | TOTAL |
|---|----------|-------|----------------|----------|-------|-------|
| WALLS, GROSS  | (SQ. FT) | 686   | 686            | 3,043    | 3,043 | 7,459 |
| GLASS   | (SQ. FT) | 96    | 96             | 1,200    | 1,344 | 2,736 |
| PERSONNEL DOOR  | (SQ. FT) | 0     | 0              | 84       | 0     | 84    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0     | 0     |
| WALLS, NET  | (SQ. FT) | 590   | 590            | 1,759    | 1,699 | 4,639 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |       | 7,093 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) |       |       |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |       | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL)                   |                             | COMPONENTS           | R-VALUE |
|---|-----------------------------|----------------------|---------|
| COMPOSITE:<br>4" BRICK = 1.2<br>PLYWOOD SHEATHING = .62 | 1.                          | OUTSIDE AIR FILM     | 0.17    |
|   | 2.                          | COMPOSITE            | 1.00    |
|   | 3.                          | AIR SPACE            | 1.00    |
|   | 4.                          | 1/4" GYPSUM BOARD    | 0.45    |
|   | 5.                          | 2" RIGID INSULATION  | 8.00    |
|   | 6.                          |                      |         |
|   | 7.                          | INSIDE AIR FILM      | 0.68    |
|   |                             | TOTAL R-WALL =       | 11.30   |
|   |                             | U=1/R                | 0.088   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                    |                             | COMPONENTS           | R-VALUE |
|   | 1.                          | OUTSIDE AIR FILM     | 0.17    |
|   | 2.                          | COMPOSITION SHINGLES | 0.00    |
|   | 3.                          | 55# FELT             | 0.06    |
|   | 4.                          | PLYWOOD SHEATHING    | 0.62    |
|   | 5.                          | AIR SPACE            | 1.00    |
|   | 6.                          | 6" BATT INSULATION   | 19.00   |
|   | 7.                          | INSIDE AIR FILM      | 0.68    |
|   |                             | TOTAL R-ROOF =       | 21.53   |
|   |                             | U=1/R                | 0.046   |
| GLASS TYPE:   | SINGLE PANE W/STORM WINDOWS | R-GLASS              | 1.60    |
| SLAB TYPE FLOOR:  | CONCRETE                    | SLF                  | 0.68    |
| BASEMENT TYPE:  | NONE                        | R-BASEM.             | 0.00    |
| OVERHEAD DOOR TYPE:                                     | NONE                        | R-ODOOR              | 0.00    |
| PERSONNEL DOOR TYPE:                                    | HOLLOW METAL                | R-PDOOR              | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                          |              |       |   |     |
|-----------------------------------|-----------------------|--------|--------------------------|--------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 798 X 0.33 Sq.In./LF= | Sq.In. | 263                      | X CFM/Sq.In. | 1.530 | = | 403 |
| PERSONNEL DOORS (SF)              | 84 X 0.16 Sq.In./SF=  | Sq.In. | 13                       | X CFM/Sq.In. | 1.530 | = | 21  |
|                                   |                       |        |                          |              |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       | 4      | X CFM /OPENING /HR       | 1.600        | =     |   | 6   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | X CFM /OPENING /HR       | 1.385        | =     |   | 0   |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |              | =     |   | 430 |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 84    | X DOOR "U"  | 0.552 | = | 46    |
| UA WALL             | = | WALL AREA   | 4,639 | X WALL "U"  | 0.088 | = | 411   |
| UA ROOF             | = | ROOF AREA   | 7,093 | X ROOF "U"  | 0.046 | = | 329   |
| UA GLASS            | = | GLASS AREA  | 2,736 | X GLASS "U" | 0.625 | = | 1,710 |
| UA SLAB             | = | SLAB PERIM. | 435   | X SLF       | 0.680 | = | 296   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE "U"  | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 430   | X A. T. F.  | 1.037 | = | 446   |
| TOTAL UA (BTU/HR°F) |   |             |       | 3,238       |       |   |       |

E M C ENGINEERS, INC.  
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 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                |
|----------------------|--------|------------|----------------|
| BLDG NO:             | 541    | BLDG NAME: | OFF QTRS MILIT |
| BLDG FUNCTION:       |        |            |                |
| FLOOR AREA: (SQ. FT) | 18,000 | # FLOORS:  | 2              |
| SLAB PERIMETER: (FT) | 530    |            |                |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST  | WEST     | TOTAL |
|---|----------|-------|----------------|-------|----------|-------|
| WALLS, GROSS  | (SQ. FT) | 686   | 686            | 3,861 | 3,861    | 9,095 |
| GLASS   | (SQ. FT) | 96    | 96             | 1,536 | 1,584    | 3,312 |
| PERSONNEL DOOR  | (SQ. FT) | 0     | 0              | 0     | 84       | 84    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0     | 0        | 0     |
| WALLS, NET  | (SQ. FT) | 590   | 590            | 2,325 | 2,193    | 5,699 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |       |          | 9,000 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR |       | (SQ. FT) | 84    |
| BASEMENT WALLS  | (SQ. FT) | 0     | 0              | 0     | 0        | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|   |                      |                         |         |
|---|----------------------|-------------------------|---------|
| II. CONSTRUCTION: ( ) FIELD VERIFIED WALL, ROOF, WINDOW, DOOR, ETC. |                      |                         |         |
| WALLS: (SKETCH CROSS SECTION OF WALL)                               |                      | COMPONENTS              | R-VALUE |
| COMPOSITE:<br>4" BRICK = 1.2<br>PLYWOOD SHEATHING = .62             |                      | 1. OUTSIDE AIR FILM     | 0.17    |
|   |                      | 2. COMPOSITE            | 1.00    |
|   |                      | 3. AIR SPACE            | 1.00    |
|   |                      | 4. 1/4" GYPSUM BOARD    | 0.45    |
|   |                      | 5. 2" RIGID INSULATION  | 8.00    |
|   |                      | 6.                      |         |
|   |                      | 7. INSIDE AIR FILM      | 0.68    |
|   |                      | TOTAL R-WALL =          | 11.30   |
|   | U=1/R                | 0.088                   |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                |                      | COMPONENTS              | R-VALUE |
|   |                      | 1. OUTSIDE AIR FILM     | 0.17    |
|   |                      | 2. COMPOSITION SHINGLES | 0.00    |
|   |                      | 3. 55# FELT             | 0.06    |
|   |                      | 4. PLYWOOD SHEATHING    | 0.62    |
|   |                      | 5. AIR SPACE            | 1.00    |
|   |                      | 6. 6" BATT INSULATION   | 19.00   |
|   |                      | 7. INSIDE AIR FILM      | 0.68    |
|   |                      | TOTAL R-ROOF =          | 21.53   |
|   | U=1/R                | 0.046                   |         |
| GLASS TYPE:   | SINGLE PANE W/STORMS | R-GLASS                 | 1.60    |
| SLAB TYPE FLOOR:  | CONCRETE             | SLF                     | 0.68    |
| BASEMENT TYPE:  | NONE                 | R-BASEM.                | 0.00    |
| OVERHEAD DOOR TYPE:   | NONE                 | R-ODOOR                 | 0.00    |
| PERSONNEL DOOR TYPE:  | HOLLOW METAL         | R-PDOOR                 | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                          |              |       |   |     |
|-----------------------------------|-----------------------|--------|--------------------------|--------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 966 X 0.33 Sq.In./LF= | Sq.In. | 319                      | X CFM/Sq.In. | 1.530 | = | 488 |
| PERSONNEL DOORS (SF)              | 84 X 0.16 Sq.In./SF=  | Sq.In. | 13                       | X CFM/Sq.In. | 1.530 | = | 21  |
|                                   |                       |        |                          |              |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       | 4      | X CFM / OPENING / HR     | 1.600        | =     |   | 6   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | X CFM / OPENING / HR     | 1.385        | =     |   | 0   |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |              | =     |   | 515 |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 84    | X DOOR "U"  | 0.552 | = | 46    |
| UA WALL             | = | WALL AREA   | 5,699 | X WALL "U"  | 0.088 | = | 504   |
| UA ROOF             | = | ROOF AREA   | 9,000 | X ROOF "U"  | 0.046 | = | 418   |
| UA GLASS            | = | GLASS AREA  | 3,312 | X GLASS "U" | 0.625 | = | 2,070 |
| UA SLAB             | = | SLAB PERIM. | 530   | X SLF       | 0.680 | = | 360   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 515   | X A. T. F.  | 1.037 | = | 534   |
| TOTAL UA (BTU/HR*F) |   |             |       |             |       |   | 3,933 |



E M C ENGINEERS, INC.  
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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                     |             |            |               |
|---------------------|-------------|------------|---------------|
| BLDG NO:            | 602         | BLDG NAME: | DENTAL CLINIC |
| BLDG FUNCTION:      | CLINIC      |            |               |
| FLOOR AREA (SQ. FT) | 11,044      | # FLOORS:  | 1             |
| SLAB PERIMETER (FT) | CRAWL SPACE |            |               |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST  | WEST     | TOTAL           |
|---|----------|-------|----------------|-------|----------|-----------------|
| WALLS, GROSS  | (SQ. FT) | 948   | 948            | 1,148 | 1,148    | 4,191           |
| GLASS   | (SQ. FT) | 80    | 174            | 96    | 90       | 440             |
| PERSONNEL DOOR  | (SQ. FT) | 0     | 42             | 42    | 42       | 126             |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0     | 0        | 0               |
| WALLS, NET  | (SQ. FT) | 868   | 732            | 1,010 | 1,016    | 3,625           |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) |          |       |                |       |          | (SQ. FT) 11,044 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR |       | (SQ. FT) | 126             |
| BASEMENT WALLS  | (SQ. FT) |       |                |       |          | 0               |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL)                             |              | COMPONENTS                           | R-VALUE     |
|---|--------------|--------------------------------------|-------------|
| COMPOSITE:<br>10" ARCH. CONCRETE = 1.39<br>INSULATED GLASS = 1.75 |              | 1. OUTSIDE AIR FILM                  | 0.17        |
|   |              | 2. COMPOSITE                         | 1.57        |
|   |              | 3. 6" BATT INSUL.                    | 19.00       |
|   |              | 4. 5/8" GYPSUM BD.                   | 0.56        |
|   |              | 5.                                   |             |
|   |              | 6.                                   |             |
|   |              | 7. INSIDE AIR FILM                   | 0.68        |
|   |              | TOTAL R-WALL =                       | 21.98       |
|   |              | U=1/R                                | 0.045       |
|   |              | ROOF: (SKETCH CROSS SECTION OF ROOF) |             |
|   |              | 1. OUTSIDE AIR FILM                  | 0.17        |
|   |              | 2. METAL ROOF                        | 0.00        |
|   |              | 3. 6" BATT INSUL.                    | 19.00       |
|   |              | 4. 2 LAYERS FELT                     | 0.12        |
|   |              | 5. 1/2" PLYWOOD                      | 0.62        |
|   |              | 6.                                   |             |
|   |              | 7. INSIDE AIR FILM                   | 0.68        |
|   |              | TOTAL R-ROOF =                       | 20.59       |
|   |              | U=1/R                                | 0.049       |
|   |              | GLASS TYPE:                          | DOUBLE PANE |
| SLAB TYPE FLOOR:  | CONCRETE     | SLF                                  | 0.68        |
| BASEMENT TYPE:  | NONE         | R-BASEM                              | 0.00        |
| OVERHEAD DOOR TYPE:   | NONE         | R-ODOOR                              | 0.00        |
| PERSONNEL DOOR TYPE:  | HOLLOW METAL | R-PDOOR                              | 1.81        |

#### III. INFILTRATION:

|                                   |                       |        |                      |                          |       |   |    |
|-----------------------------------|-----------------------|--------|----------------------|--------------------------|-------|---|----|
| WINDOWS (LF of Crack)             | 0 X 0.27 Sq.In./LF=   | Sq.In. | 0                    | X CFM/Sq.In.             | 1.530 | = | 0  |
| PERSONNEL DOORS (SF)              | 126 X 0.16 Sq.In./SF= | Sq.In. | 20                   | X CFM/Sq.In.             | 1.530 | = | 31 |
|                                   |                       |        |                      |                          |       |   |    |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM / OPENING / HR | 1.600                    | =     |   | 0  |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       | 4      | X CFM / OPENING / HR | 1.385                    | =     |   | 6  |
|                                   |                       |        |                      | TOTAL INFILTRATION (CFM) |       | = | 36 |

|                     |   |                         |        |             |       |   |       |
|---------------------|---|-------------------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA              | 0      | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA              | 126    | X DOOR "U"  | 0.552 | = | 70    |
| UA WALL             | = | WALL AREA               | 3,625  | X WALL "U"  | 0.045 | = | 165   |
| UA ROOF             | = | ROOF AREA               | 11,044 | X ROOF "U"  | 0.049 | = | 536   |
| UA GLASS            | = | GLASS AREA              | 440    | X GLASS "U" | 0.571 | = | 251   |
| UA SLAB             | = | SLAB PERIM. CRAWL SPACE |        | X SLF       | 0.680 | = | 0     |
| UA BASEM.           | = | B-WALL AREA             | 0      | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM                     | 36     | X A. T. F.  | 1.037 | = | 38    |
| TOTAL UA (BTU/HR°F) |   |                         |        |             |       |   | 1,060 |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                     |          |            |                   |
|---------------------|----------|------------|-------------------|
| BLDG NO:            | 610      | BLDG NAME: | ENL BARRACKS W/AS |
| BLDG FUNCTION:      | BARRACKS |            |                   |
| FLOOR AREA (SQ. FT) | 28,804   | # FLOORS:  | 4                 |
| SLAB PERIMETER (FT) |          |            |                   |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST  | TOTAL  |
|---|----------|-------|----------------|----------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 1,248 | 1,248          | 7,595    | 7,595 | 17,686 |
| GLASS   | (SQ. FT) | 0     | 0              | 2,445    | 2,430 | 4,875  |
| PERSONNEL DOOR  | (SQ. FT) | 105   | 0              | 126      | 42    | 273    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0     | 0      |
| WALLS, NET  | (SQ. FT) | 1,143 | 1,248          | 5,024    | 5,123 | 12,538 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |       | 8,639  |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) |       | 273    |
| BASEMENT WALLS  | (SQ. FT) | 390   | 390            | 740      | 740   | 2,260  |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|  |                             |                            |         |
|--|-----------------------------|----------------------------|---------|
| II. CONSTRUCTION: ( [ ] ) FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES, |                             |                            |         |
| WALLS: (SKETCH CROSS SECTION OF WALL)                                    |                             | COMPONENTS                 | R-VALUE |
|  |                             | 1. OUTSIDE AIR FILM        | 0.17    |
|  |                             | 2. 4" BRICK                | 1.20    |
|  |                             | 3. AIR SPACE               | 1.00    |
|  |                             | 4. 6" CMU                  | 0.92    |
|  |                             | 5. AIR SPACE               | 1.00    |
|  |                             | 6. 1/4" GYPSUM BOARD       | 0.45    |
|  |                             | 7. INSIDE AIR FILM         | 0.68    |
|  |                             | TOTAL R-WALL =             | 5.42    |
|  |                             | U=1/R                      | 0.185   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                     |                             | COMPONENTS                 | R-VALUE |
|  |                             | 1. OUTSIDE AIR FILM        | 0.17    |
|  |                             | 2. BUR                     | 0.33    |
|  |                             | 3. 2" RIGID INSUL.         | 5.56    |
|  |                             | 4. 2" LIGHTWEIGHT CONCRETE | 0.52    |
|  |                             | 5.                         |         |
|  |                             | 6.                         |         |
|  |                             | 7. INSIDE AIR FILM         | 0.68    |
|  |                             | TOTAL R-ROOF =             | 7.26    |
|  |                             | U=1/R                      | 0.138   |
| GLASS TYPE:  | SINGLE PANE W/STORM WINDOWS | R-GLASS                    | 1.60    |
| SLAB TYPE FLOOR:   | CONCRETE                    | SLF                        | 0.68    |
| BASEMENT TYPE:   | NONE                        | R-BASEM.                   | 10.00   |
| OVERHEAD DOOR TYPE:  | NONE                        | R-ODOOR                    | 0.00    |
| PERSONNEL DOOR TYPE:   | HOLLOW METAL                | R-PDOOR                    | 1.81    |

#### III. INFILTRATION:

|                                   |                        |        |     |                    |       |   |      |
|-----------------------------------|------------------------|--------|-----|--------------------|-------|---|------|
| WINDOWS (LF of Crack)             | 2600 X 0.33 Sq.In./LF= | Sq.In. | 858 | X CFM/Sq.In.       | 1.530 | = | 1313 |
| PERSONNEL DOORS (SF)              | 273 X 0.16 Sq.In./SF=  | Sq.In. | 44  | X CFM/Sq.In.       | 1.530 | = | 67   |
| DOOR OPENINGS / HR - SINGLE DOOR  |                        |        |     | X CFM /OPENING /HR | 1.600 | = | 0    |
| DOOR OPENINGS / HR - DOUBLE DOORS |                        |        | 8   | X CFM /OPENING /HR | 1.385 | = | 11   |
| TOTAL INFILTRATION (CFM)          |                        |        |     |                    |       | = | 1391 |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 273    | X DOOR "U"  | 0.552 | = | 151   |
| UA WALL             | = | WALL AREA   | 12,538 | X WALL "U"  | 0.185 | = | 2,313 |
| UA ROOF             | = | ROOF AREA   | 8,639  | X ROOF "U"  | 0.138 | = | 1,190 |
| UA GLASS            | = | GLASS AREA  | 4,875  | X GLASS "U" | 0.625 | = | 3,047 |
| UA SLAB             | = | SLAB PERIM. | 0      | X SLF       | 0.680 | = | 0     |
| UA BASEM.           | = | B-WALL AREA | 2,260  | X BASE. "U" | 0.100 | = | 226   |
| INFILTRATION        | = | CFM         | 1391   | X A. T. F.  | 1.037 | = | 1,442 |
| TOTAL UA (BTU/HR*F) |   |             |        |             |       |   | 8,369 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                |
|----------------------|--------|------------|----------------|
| BLDG NO:             | 620    | BLDG NAME: | OFF QTRS MILIT |
| BLDG FUNCTION:       |        |            |                |
| FLOOR AREA: (SQ. FT) | 11,359 | # FLOORS:  | 2              |
| SLAB PERIMETER: (FT) | 493    |            |                |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST | TOTAL |
|---|----------|-------|----------------|----------|------|-------|
| WALLS, GROSS  | (SQ. FT) | 3,741 | 3,741          | 437      | 437  | 8,355 |
| GLASS   | (SQ. FT) | 784   | 728            | 0        | 28   | 1,540 |
| PERSONNEL DOOR  | (SQ. FT) | 84    | 0              | 0        | 0    | 84    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0    | 0     |
| WALLS, NET  | (SQ. FT) | 2,873 | 3,013          | 437      | 409  | 6,731 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |      | 7,499 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) | 84   |       |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |      | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL)                                 |              | COMPONENTS        | R-VALUE |
|---|--------------|-------------------|---------|
| COMPOSITES<br>VERTICAL WOOD SIDING W/BATTENS = 1.17<br>4" BRICK = 1.2 | 1.           | OUTSIDE AIR FILM  | 0.17    |
|   | 2.           | COMPOSITE WALL    | 1.18    |
|   | 3.           | AIR SPACE         | 1.00    |
|   | 4.           | 1" INSULATION     | 4.00    |
|   | 5.           | 1/2" GYPSUM BOARD | 0.45    |
|   | 6.           |                   |         |
|   | 7.           | INSIDE AIR FILM   | 0.68    |
|   |              | TOTAL R-WALL =    | 7.48    |
|   |              | U=1/R             | 0.134   |
|   |              |                   |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                  |              | COMPONENTS        | R-VALUE |
|   | 1.           | OUTSIDE AIR FILM  | 0.17    |
|   | 2.           | SHINGLES          | 0.83    |
|   | 3.           | 2" INSULATION     | 5.56    |
|   | 4.           | AIR SPACE         | 1.00    |
|   | 5.           |                   |         |
|   | 6.           |                   |         |
|   | 7.           | INSIDE AIR FILM   | 0.68    |
|   |              | TOTAL R-ROOF =    | 8.24    |
|   |              | U=1/R             | 0.121   |
|   |              |                   |         |
| GLASS TYPE:   | SINGLE PANE  | R-GLASS           | 0.90    |
| SLAB TYPE FLOOR:  | CONCRETE     | SLF               | 0.68    |
| BASEMENT TYPE:  | NONE         | R-BASEM.          | 0.00    |
| OVERHEAD DOOR TYPE:   | NONE         | R-ODOOR           | 0.00    |
| PERSONNEL DOOR TYPE:  | HOLLOW METAL | R-PDOOR           | 1.81    |

#### III. INFILTRATION:

|                                   |                       |                    |       |              |       |   |     |
|-----------------------------------|-----------------------|--------------------|-------|--------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 915 X 0.33 Sq.In./LF= | Sq.In.             | 302   | X CFM/Sq.In. | 1.530 | = | 462 |
| PERSONNEL DOORS (SF)              | 84 X 0.16 Sq.In./SF=  | Sq.In.             | 13    | X CFM/Sq.In. | 1.530 | = | 21  |
| DOOR OPENINGS / HR - SINGLE DOOR  | 4                     | X CFM /OPENING /HR | 1.600 | =            | 6     |   |     |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       | X CFM /OPENING /HR | 1.385 | =            | 0     |   |     |
| TOTAL INFILTRATION (CFM)          |                       |                    |       |              |       | = | 489 |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 84    | X DOOR "U"  | 0.552 | = | 46    |
| UA WALL             | = | WALL AREA   | 6,731 | X WALL "U"  | 0.134 | = | 900   |
| UA ROOF             | = | ROOF AREA   | 7,499 | X ROOF "U"  | 0.121 | = | 911   |
| UA GLASS            | = | GLASS AREA  | 1,540 | X GLASS "U" | 1.111 | = | 1,711 |
| UA SLAB             | = | SLAB PERIM. | 493   | X SLF       | 0.680 | = | 335   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 489   | X A. T. F.  | 1.037 | = | 507   |
| TOTAL UA (BTU/HR°F) |   |             |       |             |       |   | 4,410 |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |                |
|----------------------|-------|------------|----------------|
| BLDG NO:             | 710   | BLDG NAME: | TAC EQUIP SHOP |
| BLDG FUNCTION:       |       |            |                |
| FLOOR AREA: (SQ. FT) | 2,125 | # FLOORS:  | 1              |
| SLAB PERIMETER: (FT) | 199   |            |                |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W | SOUTH-E  | TOTAL |
|---|----------|---------|----------------|---------|----------|-------|
| WALLS, GROSS  | (SQ. FT) | 944     | 1,195          | 1,195   | 944      | 4,276 |
| GLASS   | (SQ. FT) | 63      | 181            | 145     | 0        | 389   |
| PERSONNEL DOOR  | (SQ. FT) | 0       | 21             | 42      | 21       | 84    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 420            | 420     | 0        | 840   |
| WALLS, NET  | (SQ. FT) | 881     | 573            | 588     | 923      | 2,963 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |         |          | 2,125 |
| OVERHEAD DOOR   | (SQ. FT) | 840     | PERSONNEL DOOR |         | (SQ. FT) | 84    |
| BASEMENT WALLS  | (SQ. FT) |         |                |         |          | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|  |                 |                        |         |
|--|-----------------|------------------------|---------|
| II. CONSTRUCTION: (1) FIELD VERIFIED WALL, ROOF, WINDOW, DOOR (1-12) |                 |                        |         |
| WALLS: (SKETCH CROSS SECTION OF WALL)                                |                 | COMPONENTS             | R-VALUE |
|  |                 | 1. OUTSIDE AIR FILM    | 0.17    |
|  |                 | 2. 2" INS METAL PANELS | 7.33    |
|  |                 | 3. 2" AIR SPACE        | 1.00    |
|  |                 | 4. 8" CMU              | 1.11    |
|  |                 | 5.                     |         |
|  |                 | 6.                     |         |
|  |                 | 7. INSIDE AIR FILM     | 0.68    |
|  |                 | TOTAL R-WALL =         | 10.29   |
|  |                 | U=1/R                  | 0.097   |
|  |                 |                        |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                 |                 | COMPONENTS             | R-VALUE |
|  |                 | 1. OUTSIDE AIR FILM    | 0.17    |
|  |                 | 2. INS METAL PANELS    | 7.33    |
|  |                 | 3. 2" RIGID INSUL      | 5.56    |
|  |                 | 4. METAL DECK          |         |
|  |                 | 5.                     |         |
|  |                 | 6.                     |         |
|  |                 | 7. INSIDE AIR FILM     | 0.68    |
|  |                 | TOTAL R-ROOF =         | 13.74   |
|  |                 | U=1/R                  | 0.073   |
|  |                 |                        |         |
| GLASS TYPE:  | SINGLE PANE     | R-GLASS                | 0.90    |
| SLAB TYPE FLOOR:   | CONCRETE        | SLF                    | 0.68    |
| BASEMENT TYPE:   | NONE            | R-BASEM.               | 0.00    |
| OVERHEAD DOOR TYPE:  | INSULATED METAL | R-ODOOR                | 7.33    |
| PERSONNEL DOOR TYPE:   | HOLLOW METAL    | R-PDOOR                | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |     |                     |       |   |     |
|-----------------------------------|-----------------------|--------|-----|---------------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 112 X 0.33 Sq.In./LF= | Sq.In. | 37  | X CFM/Sq.In.        | 1.530 | = | 57  |
| PERSONNEL DOORS (SF)              | 84 X 0.16 Sq.In./SF=  | Sq.In. | 13  | X CFM/Sq.In.        | 1.530 | = | 21  |
| OVERHEAD DOORS (SF)               |                       |        | 840 | X CFM/Sq.Ft.        | 0.228 | = | 192 |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | 4   | X CFM / OPENING /HR | 1.600 | = | 6   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | 4   | X CFM / OPENING /HR | 1.385 | = | 6   |
| TOTAL INFILTRATION (CFM)          |                       |        |     |                     |       |   | 281 |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 840   | X DOOR "U"  | 0.136 | = | 115   |
| UA PDOOR            | = | PDOOR AREA  | 84    | X DOOR "U"  | 0.552 | = | 46    |
| UA WALL             | = | WALL AREA   | 2,963 | X WALL "U"  | 0.097 | = | 288   |
| UA ROOF             | = | ROOF AREA   | 2,125 | X ROOF "U"  | 0.073 | = | 155   |
| UA GLASS            | = | GLASS AREA  | 389   | X GLASS "U" | 1.111 | = | 432   |
| UA SLAB             | = | SLAB PERIM. | 199   | X SLF       | 0.680 | = | 135   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 281   | X A. T. F.  | 1.037 | = | 291   |
| TOTAL UA (BTU/HR°F) |   |             |       |             |       |   | 1,462 |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                     |       |            |             |
|---------------------|-------|------------|-------------|
| BLDG NO:            | 720   | BLDG NAME: | AF OPS BLDG |
| BLDG FUNCTION:      |       |            |             |
| FLOOR AREA (SQ. FT) | 3,714 | # FLOORS:  | 1           |
| SLAB PERIMETER (FT) | 248   |            |             |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL |
|---|----------|---------|----------------|----------|---------|-------|
| WALLS, GROSS  | (SQ. FT) | 712     | 1,022          | 1,022    | 712     | 3,469 |
| GLASS   | (SQ. FT) | 75      | 0              | 113      | 0       | 188   |
| PERSONNEL DOOR  | (SQ. FT) | 35      | 0              | 0        | 77      | 112   |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0     |
| WALLS, NET  | (SQ. FT) | 602     | 1,022          | 910      | 636     | 3,170 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 3,714 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) |         | 112   |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS            | R-VALUE |
|---------------------------------------|--------------|-----------------------|---------|
|                                       | 1.           | OUTSIDE AIR FILM      | 0.17    |
|                                       | 2.           | 4" BRICK              | 1.20    |
|                                       | 3.           | 2" AIR SPACE          | 1.00    |
|                                       | 4.           | 8" MASONRY UNITS      | 1.29    |
|                                       | 5.           | AIR SPACE             | 1.00    |
|                                       | 6.           | 1/4" GYPSUM BOARD     | 0.45    |
|                                       | 7.           | INSIDE AIR FILM       | 0.68    |
|                                       |              | TOTAL R-WALL =        | 5.79    |
|                                       | U=1/R        | 0.173                 |         |
|                                       |              |                       |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS            | R-VALUE |
|                                       | 1.           | OUTSIDE AIR FILM      | 0.17    |
|                                       | 2.           | 5 PLY BUR             | 0.33    |
|                                       | 3.           | 2" RIGID INSULATION   | 5.56    |
|                                       | 4.           | 1/5" SHEET METAL ROOF | 0.00    |
|                                       | 5.           |                       |         |
|                                       | 6.           |                       |         |
|                                       | 7.           | INSIDE AIR FILM       | 0.68    |
|                                       |              | TOTAL R-ROOF =        | 6.74    |
|                                       | U=1/R        | 0.148                 |         |
|                                       |              |                       |         |
| GLASS TYPE:                           | SINGLE PANE  | R-GLASS               | 0.90    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                   | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.              | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR               | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR               | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                    |                          |       |   |    |
|-----------------------------------|-----------------------|--------|--------------------|--------------------------|-------|---|----|
| WINDOWS (LF of Crack)             | 36 X 0.33 Sq.In./LF=  | Sq.In. | 12                 | X CFM/Sq.In.             | 1.530 | = | 18 |
| PERSONNEL DOORS (SF)              | 112 X 0.16 Sq.In./SF= | Sq.In. | 18                 | X CFM/Sq.In.             | 1.530 | = | 27 |
|                                   |                       |        |                    |                          |       |   |    |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       | 1      | X CFM /OPENING /HR | 1.600                    | =     |   | 2  |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       | 1      | X CFM /OPENING /HR | 1.385                    | =     |   | 1  |
|                                   |                       |        |                    | TOTAL INFILTRATION (CFM) |       | = | 49 |

|              |   |             |       |                     |       |   |       |
|--------------|---|-------------|-------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 0     | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 112   | X DOOR "U"          | 0.552 | = | 62    |
| UA WALL      | = | WALL AREA   | 3,170 | X WALL "U"          | 0.173 | = | 547   |
| UA ROOF      | = | ROOF AREA   | 3,714 | X ROOF "U"          | 0.148 | = | 551   |
| UA GLASS     | = | GLASS AREA  | 188   | X GLASS "U"         | 1.111 | = | 208   |
| UA SLAB      | = | SLAB PERIM. | 248   | X SLF               | 0.680 | = | 168   |
| UA BASEM.    | = | B-WALL AREA | 0     | X BASE. "U"         | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 49    | X A. T. F.          | 1.037 | = | 50    |
|              |   |             |       | TOTAL UA (BTU/HR°F) |       |   | 1,587 |

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 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 18-Jul-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |                  |
|----------------------|-------|------------|------------------|
| BLDG NO:             | 722   | BLDG NAME: | FLIGHT SIMULATOR |
| BLDG FUNCTION:       |       |            |                  |
| FLOOR AREA: (SQ. FT) | 6,400 | # FLOORS:  | 1                |
| SLAB PERIMETER: (FT) | 320   |            |                  |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL |
|---|----------|---------|----------------|----------|---------|-------|
| WALLS, GROSS  | (SQ. FT) | 2,160   | 1,812          | 1,812    | 2,160   | 7,944 |
| GLASS   | (SQ. FT) | 150     | 22             | 0        | 0       | 172   |
| PERSONNEL DOOR  | (SQ. FT) | 42      | 63             | 42       | 0       | 147   |
| OVERHEAD DOOR   | (SQ. FT) |         |                |          |         | 0     |
| WALLS, NET  | (SQ. FT) | 1,968   | 1,728          | 1,770    | 2,160   | 7,626 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         |       |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) |         | 147   |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|   |  |                                      |                     |            |
|---|--|--------------------------------------|---------------------|------------|
| II. CONSTRUCTION: ( ) FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPE: |  | COMPONENTS                           |                     | R-VALUE    |
| WALLS: (SKETCH CROSS SECTION OF WALL)                               |  | 1.                                   | OUTSIDE AIR FILM    | 0.17       |
|   |  | 2.                                   | 8" CONCRETE BLOCK   | 1.11       |
|   |  | 3.                                   | 3" BATT INSUL.      | 11.00      |
|   |  | 4.                                   | 1/2" G.W.B.         | 0.45       |
|   |  | 5.                                   |                     |            |
|   |  | 6.                                   |                     |            |
|   |  | 7.                                   | INSIDE AIR FILM     | 0.68       |
|   |  | TOTAL R-WALL =                       |                     | 13.41      |
|   |  | U=1/R                                |                     | 0.075      |
|   |  |                                      |                     |            |
|   |  | ROOF: (SKETCH CROSS SECTION OF ROOF) |                     | COMPONENTS |
|   |  | 1.                                   | OUTSIDE AIR FILM    | 0.17       |
|   |  | 2.                                   | BUR                 | 0.33       |
|   |  | 3.                                   | 2" RIGID INSULATION | 5.56       |
|   |  | 4.                                   | METAL DECK          | 0.00       |
|   |  | 5.                                   |                     |            |
|   |  | 6.                                   |                     |            |
|   |  | 7.                                   | INSIDE AIR FILM     | 0.68       |
|   |  | TOTAL R-ROOF =                       |                     | 6.74       |
|   |  | U=1/R                                |                     | 0.148      |
|   |  |                                      |                     |            |
| GLASS TYPE:   |  | DOUBLE PANE                          | R-GLASS             | 1.75       |
| SLAB TYPE FLOOR:  |  | CONCRETE                             | SLF                 | 0.68       |
| BASEMENT TYPE:  |  | NONE                                 | R-BASEM.            | 0.00       |
| OVERHEAD DOOR TYPE:   |  | NONE                                 | R-ODOOR             | 0.00       |
| PERSONNEL DOOR TYPE:  |  | HOLLOW METAL                         | R-PDOOR             | 1.81       |

#### III. INFILTRATION:

|                                   |                       |                      |       |                          |       |   |    |
|-----------------------------------|-----------------------|----------------------|-------|--------------------------|-------|---|----|
| WINDOWS (LF of Crack)             | X 0.27 Sq.In./LF=     | Sq.In.               | 0     | X CFM/Sq.In.             | 1.530 | = | 0  |
| PERSONNEL DOORS (SF)              | 147 X 0.16 Sq.In./SF= | Sq.In.               | 24    | X CFM/Sq.In.             | 1.530 | = | 36 |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       | X CFM / OPENING / HR | 1.600 | =                        |       |   | 0  |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       | X CFM / OPENING / HR | 1.385 | =                        |       |   | 0  |
|                                   |                       |                      |       | TOTAL INFILTRATION (CFM) |       | = | 36 |

|              |   |             |       |                     |       |   |     |
|--------------|---|-------------|-------|---------------------|-------|---|-----|
| UA ODOOR     | = | ODOOR AREA  | 0     | X DOOR "U"          | 0.000 | = | 0   |
| UA PDOOR     | = | PDOOR AREA  | 147   | X DOOR "U"          | 0.552 | = | 81  |
| UA WALL      | = | WALL AREA   | 7,626 | X WALL "U"          | 0.075 | = | 569 |
| UA ROOF      | = | ROOF AREA   | 0     | X ROOF "U"          | 0.148 | = | 0   |
| UA GLASS     | = | GLASS AREA  | 172   | X GLASS "U"         | 0.571 | = | 98  |
| UA SLAB      | = | SLAB PERIM. | 320   | X SLF               | 0.680 | = | 218 |
| UA BASEM     | = | B-WALL AREA | 0     | X BASE. "U"         | 0.000 | = | 0   |
| INFILTRATION | = | CFM         | 36    | X A. T. F.          | 0.852 | = | 31  |
|              |   |             |       | TOTAL UA (BTU/HR°F) |       |   | 996 |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |               |
|----------------------|--------|------------|---------------|
| BLDG NO:             | 723    | BLDG NAME: | MAINT. HANGER |
| BLDG FUNCTION:       | MAINT  |            |               |
| FLOOR AREA: (SQ. FT) | 21,355 | # FLOORS:  | 1 & 2         |
| SLAB PERIMETER: (FT) | 521    |            |               |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL  |
|---|----------|---------|----------------|----------|---------|--------|
| WALLS, GROSS  | (SQ. FT) | 4,115   | 3,522          | 3,522    | 4,115   | 15,274 |
| GLASS   | (SQ. FT) | 0       | 557            | 691      | 0       | 1,248  |
| PERSONNEL DOOR  | (SQ. FT) | 0       | 187            | 68       | 0       | 254    |
| OVERHEAD DOOR   | (SQ. FT) | 1,960   | 0              | 0        | 1,960   | 3,920  |
| WALLS, NET  | (SQ. FT) | 2,155   | 2,778          | 2,763    | 2,155   | 9,852  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 17,030 |
| OVERHEAD DOOR   | (SQ. FT) | 3,920   | PERSONNEL DOOR | (SQ. FT) | 254     |        |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL)   |                 | COMPOSITES       | R-VALUE |
|---|-----------------|------------------|---------|
| COMPONENTS:<br>8" MASONRY UNITS = 1.11<br>1" INSULATION = 4.0<br>METAL SIDING = 0<br>CORRUGATED SIDING = 4.85<br>IA FILM = .68<br>OA FILM = .17 | 1.              | NE WALL          | 2.59    |
|   | 2.              | SW WALL          | 2.59    |
|   | 3.              | NW WALL          | 4.85    |
|   | 4.              | SE WALL          | 4.85    |
|   | 5.              |                  |         |
|   | 6.              |                  |         |
|   | 7.              |                  |         |
|   |                 | COMP. R-WALL =   | 3.58    |
|   |                 | U=1/R            | 0.279   |
|   |                 |                  |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |                 | COMPONENTS       | R-VALUE |
|   | 1.              | OUTSIDE AIR FILM | 0.17    |
|   | 2.              | ROOF DECK        | 0.00    |
|   | 3.              | INSULATION       | 4.00    |
|   | 4.              | 5 PLY BUR        | 0.33    |
|   | 5.              |                  |         |
|   | 6.              |                  |         |
|   | 7.              | INSIDE AIR FILM  | 0.68    |
|   |                 | TOTAL R-ROOF =   | 5.18    |
|   |                 | U=1/R            | 0.193   |
|   |                 |                  |         |
| GLASS TYPE:   | SINGLE PANE     | R-GLASS          | 0.90    |
| SLAB TYPE FLOOR:  | CONCRETE        | SLF              | 0.68    |
| BASEMENT TYPE:  | NONE            | R-BASEM.         | 0.00    |
| OVERHEAD DOOR TYPE:   | INSULATED METAL | R-ODOOR          | 7.33    |
| PERSONNEL DOOR TYPE:  | HOLLOW METAL    | R-PDOOR          | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                    |                          |       |   |      |
|-----------------------------------|-----------------------|--------|--------------------|--------------------------|-------|---|------|
| WINDOWS (LF of Crack)             | 590 X 0.33 Sq.In./LF= | Sq.In. | 195                | X CFM/Sq.In.             | 1.530 | = | 298  |
| PERSONNEL DOORS (SF)              | 254 X 0.16 Sq.In./SF= | Sq.In. | 41                 | X CFM/Sq.In.             | 1.530 | = | 62   |
| OVERHEAD DOOR (SF)                |                       |        | 3920               | X CFM/Sq.Ft.             | 0.228 | = | 894  |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       | 5      | X CFM /OPENING /HR | 1.600                    | =     | 8 |      |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       | 5      | X CFM /OPENING /HR | 1.385                    | =     | 7 |      |
|                                   |                       |        |                    | TOTAL INFILTRATION (CFM) |       | = | 1269 |

|              |   |             |        |                     |       |   |       |
|--------------|---|-------------|--------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 3,920  | X DOOR "U"          | 0.136 | = | 535   |
| UA PDOOR     | = | PDOOR AREA  | 254    | X DOOR "U"          | 0.552 | = | 141   |
| UA WALL      | = | WALL AREA   | 9,852  | X WALL "U"          | 0.279 | = | 2,752 |
| UA ROOF      | = | ROOF AREA   | 17,030 | X ROOF "U"          | 0.193 | = | 3,288 |
| UA GLASS     | = | GLASS AREA  | 1,248  | X GLASS "U"         | 1.111 | = | 1,387 |
| UA SLAB      | = | SLAB PERIM. | 521    | X SLF               | 0.680 | = | 354   |
| UA BASEM.    | = | B-WALL AREA | 0      | X BASE. "U"         | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 1269   | X A. T. F.          | 1.037 | = | 1,316 |
|              |   |             |        | TOTAL UA (BTU/HR*F) |       |   | 9,771 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                 |
|----------------------|--------|------------|-----------------|
| BLDG NO:             | 727    | BLDG NAME: | MNT HANGAR COMB |
| BLDG FUNCTION:       | MAINT  |            |                 |
| FLOOR AREA: (SQ. FT) | 32,758 | # FLOORS:  | 1               |
| SLAB PERIMETER: (FT) | 881    |            |                 |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST  | TOTAL  |
|---|----------|-------|----------------|----------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 6,630 | 6,630          | 8,443    | 8,443 | 30,145 |
| GLASS   | (SQ. FT) | 161   | 93             | 0        | 0     | 255    |
| PERSONNEL DOOR  | (SQ. FT) | 126   | 84             | 0        | 126   | 336    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 95             | 4,257    | 4,257 | 8,609  |
| WALLS, NET  | (SQ. FT) | 6,343 | 6,358          | 4,186    | 4,060 | 20,946 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |       | 33,052 |
| OVERHEAD DOOR   | (SQ. FT) | 8,609 | PERSONNEL DOOR | (SQ. FT) |       | 336    |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |       | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |                            | COMPOSITES        | R-VALUE |
|---------------------------------------|----------------------------|-------------------|---------|
| COMPONENTS:                           |                            | 1. NORTH WALL     | 6.44    |
| ADDITIONS:                            | EXISTING:                  | 2. SOUTH WALL     | 6.70    |
| 4" RIGID INSULATION = 11.12           | 8" CMU = 1.11              | 3. EAST WALL      | 2.65    |
| 1/2" GWB = 0.45                       | METAL SIDING = 0           | 4. WEST WALL      | 4.36    |
| 10" CMU = 1.39                        | OA FILM = .17              | 5.                |         |
| IA FILM = .68                         | IA FILM = .68              | 6.                |         |
| OA FILM = .17                         |                            | 7.                |         |
|                                       |                            | COMP. R-WALL =    | 5.36    |
|                                       |                            | U=1/R             | 0.187   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |                            | COMPOSITE:        | R-VALUE |
| COMPONENTS:                           |                            | 1. 59.73% OF ROOF | 4.79    |
| ADDITIONS:                            | EXISTING:                  | 2. 40.26% OF ROOF | 6.74    |
| OA FILM = 0.17                        | OA FILM = 0.17             | 3.                |         |
| BUR = 0.33                            | BUR = 0.33                 | 4.                |         |
| 2" RIGID INSULATION = 5.56            | 1" RIGID INSULATION = 2.78 | 5.                |         |
| METAL DECK = 0                        | WOOD DECK = .825           | 6.                |         |
| IA FILM = .17                         | IA FILM = .68              | 7.                |         |
| 6.74 = R                              | 4.785 = R                  | COMP. R-ROOF =    | 5.95    |
|                                       |                            | U=1/R             | 0.168   |
| GLASS TYPE:                           | SINGLE PANE                | R-GLASS           | 0.90    |
| SLAB TYPE FLOOR:                      | CONCRETE                   | SLF               | 0.68    |
| BASEMENT TYPE:                        | NONE                       | R-BASEM.          | 0.00    |
| OVERHEAD DOOR TYPE:                   | INSULATED METAL            | R-ODOOR           | 7.33    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL               | R-PDOOR           | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |      |                    |       |   |      |
|-----------------------------------|-----------------------|--------|------|--------------------|-------|---|------|
| WINDOWS (LF of Crack)             | X 0.27 Sq.In./LF=     | Sq.In. | 0    | X CFM/Sq.In.       | 1.530 | = | 0    |
| PERSONNEL DOORS (SF)              | 336 X 0.16 Sq.In./SF= | Sq.In. | 54   | X CFM/Sq.In.       | 1.530 | = | 82   |
| OVERHEAD DOORS (SF)               |                       |        | 8609 | X CFM/Sq.Ft.       | 0.228 | = | 1963 |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        |      | X CFM /OPENING /HR | 1.600 | = | 0    |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        |      | X CFM /OPENING /HR | 1.385 | = | 0    |
| TOTAL INFILTRATION (CFM)          |                       |        |      |                    |       |   | 2045 |

|                     |   |             |        |             |       |   |        |
|---------------------|---|-------------|--------|-------------|-------|---|--------|
| UA ODOOR            | = | ODOOR AREA  | 8,609  | X DOOR "U"  | 0.136 | = | 1,174  |
| UA PDOOR            | = | PDOOR AREA  | 336    | X DOOR "U"  | 0.552 | = | 185    |
| UA WALL             | = | WALL AREA   | 20,946 | X WALL "U"  | 0.187 | = | 3,908  |
| UA ROOF             | = | ROOF AREA   | 33,052 | X ROOF "U"  | 0.168 | = | 5,555  |
| UA GLASS            | = | GLASS AREA  | 255    | X GLASS "U" | 1.111 | = | 283    |
| UA SLAB             | = | SLAB PERIM. | 881    | X SLF       | 0.680 | = | 599    |
| UA BASEM.           | = | B-WALL AREA | 0      | X BASE. "U" | 0.000 | = | 0      |
| INFILTRATION        | = | CFM         | 2045   | X A. T. F.  | 1.037 | = | 2,121  |
| TOTAL UA (BTU/HR°F) |   |             |        |             |       |   | 13,826 |



E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |                 |
|----------------------|-------|------------|-----------------|
| BLDG NO:             | 751   | BLDG NAME: | AC PTS & TOE ST |
| BLDG FUNCTION:       |       |            |                 |
| FLOOR AREA: (SQ. FT) | 9,809 | # FLOORS:  | 1               |
| SLAB PERIMETER: (FT) | 422   |            |                 |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST | TOTAL |
|---|----------|-------|----------------|----------|------|-------|
| WALLS, GROSS  | (SQ. FT) | 1,988 | 1,988          | 967      | 967  | 5,910 |
| GLASS   | (SQ. FT) | 192   | 288            | 192      | 144  | 816   |
| PERSONNEL DOOR  | (SQ. FT) | 63    | 42             | 42       | 0    | 147   |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0    | 0     |
| WALLS, NET  | (SQ. FT) | 1,733 | 1,658          | 733      | 823  | 4,947 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |      | 9,809 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) |      | 147   |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |      | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS            | R-VALUE |
|---------------------------------------|--------------|-----------------------|---------|
|                                       |              | 1. OUTSIDE AIR FILM   | 0.17    |
|                                       |              | 2. 18" SANDSTONE      | 1.28    |
|                                       |              | 3. AIR SPACE          | 1.00    |
|                                       |              | 4. 1/2" GYPSUM BOARD  | 0.45    |
|                                       |              | 5.                    |         |
|                                       |              | 6.                    |         |
|                                       |              | 7. INSIDE AIR FILM    | 0.68    |
|                                       |              | TOTAL R-WALL =        | 3.58    |
|                                       |              | U=1/R                 | 0.279   |
|                                       |              |                       |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS            | R-VALUE |
|                                       |              | 1. OUTSIDE AIR FILM   | 0.17    |
|                                       |              | 2. SHINGLES           | 0.44    |
|                                       |              | 3. 3/4" WOOD          | 0.83    |
|                                       |              | 4. 3" BATT INSULATION | 11.00   |
|                                       |              | 5.                    |         |
|                                       |              | 6.                    |         |
|                                       |              | 7. INSIDE AIR FILM    | 0.68    |
|                                       |              | TOTAL R-ROOF =        | 13.12   |
|                                       |              | U=1/R                 | 0.076   |
|                                       |              |                       |         |
| GLASS TYPE:                           | SINGLE PANE  | R-GLASS               | 0.90    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                   | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.              | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR               | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR               | 1.81    |

#### III. INFILTRATION:

|                                   |                       |                      |       |              |       |     |     |
|-----------------------------------|-----------------------|----------------------|-------|--------------|-------|-----|-----|
| WINDOWS (LF of Crack)             | 374 X 0.33 Sq.In./LF= | Sq.In.               | 123   | X CFM/Sq.In. | 1.530 | =   | 189 |
| PERSONNEL DOORS (SF)              | 147 X 0.16 Sq.In./SF= | Sq.In.               | 24    | X CFM/Sq.In. | 1.530 | =   | 36  |
| DOOR OPENINGS / HR - SINGLE DOOR  | 2                     | X CFM / OPENING / HR | 1.600 | =            | 3     |     |     |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       | X CFM / OPENING / HR | 1.385 | =            | 0     |     |     |
| TOTAL INFILTRATION (CFM)          |                       |                      |       |              | =     | 228 |     |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 147   | X DOOR "U"  | 0.552 | = | 81    |
| UA WALL             | = | WALL AREA   | 4,947 | X WALL "U"  | 0.279 | = | 1,382 |
| UA ROOF             | = | ROOF AREA   | 9,809 | X ROOF "U"  | 0.076 | = | 748   |
| UA GLASS            | = | GLASS AREA  | 816   | X GLASS "U" | 1.111 | = | 907   |
| UA SLAB             | = | SLAB PERIM. | 422   | X SLF       | 0.680 | = | 287   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE "U"  | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 228   | X A. T. F.  | 1.037 | = | 236   |
| TOTAL UA (BTU/HR°F) |   |             |       |             |       |   | 3,641 |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                    |
|----------------------|--------|------------|--------------------|
| BLDG NO:             | 810    | BLDG NAME: | ADM & SUPPORT BLDG |
| BLDG FUNCTION:       |        |            |                    |
| FLOOR AREA: (SQ. FT) | 15,150 | # FLOORS:  | 1                  |
| SLAB PERIMETER: (FT) | 580    |            |                    |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST  | TOTAL  |
|---|----------|-------|----------------|----------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 1,414 | 1,882          | 2,513    | 2,513 | 8,322  |
| GLASS   | (SQ. FT) | 0     | 0              | 0        | 328   | 328    |
| PERSONNEL DOOR  | (SQ. FT) | 0     | 0              | 378      | 84    | 462    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0     | 0      |
| WALLS, NET  | (SQ. FT) | 1,414 | 1,882          | 2,135    | 2,101 | 7,532  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |       | 20,297 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) |       | 462    |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |       | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| II. CONSTRUCTION: ( [ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES) |              | COMPONENTS                           | R-VALUE |                     |         |
|--|--------------|--------------------------------------|---------|---------------------|---------|
| WALLS: (SKETCH CROSS SECTION OF WALL)                                  |              | 1. OUTSIDE AIR FILM                  | 0.17    |                     |         |
|  |              | 2. 6" JUMBO BRICK                    | 1.80    |                     |         |
|  |              | 3. 2" INSULATION                     | 8.00    |                     |         |
|  |              | 4. 6" CMU                            | 1.29    |                     |         |
|  |              | 5.                                   |         |                     |         |
|  |              | 6.                                   |         |                     |         |
|  |              | 7. INSIDE AIR FILM                   | 0.68    |                     |         |
|  |              | TOTAL R-WALL =                       | 11.94   |                     |         |
|  |              | U=1/R                                | 0.084   |                     |         |
|  |              | ROOF: (SKETCH CROSS SECTION OF ROOF) |         | COMPONENTS          | R-VALUE |
|  |              |                                      |         | 1. OUTSIDE AIR FILM | 0.17    |
| 2. SHINGLES  | 0.44         |                                      |         |                     |         |
| 3. FELT UNDERLAYMENT   | 0.06         |                                      |         |                     |         |
| 4. 1/2" PLYWOOD SHEATHING  | 0.62         |                                      |         |                     |         |
| 5. METAL DECK  | 0.00         |                                      |         |                     |         |
| 6. 2" INSULATION   | 5.56         |                                      |         |                     |         |
| 7. INSIDE AIR FILM   | 0.68         |                                      |         |                     |         |
| TOTAL R-ROOF =   | 7.53         |                                      |         |                     |         |
| U=1/R  | 0.133        |                                      |         |                     |         |
| GLASS TYPE:  | SINGLE PANE  |                                      |         | R-GLASS             | 0.90    |
| SLAB TYPE FLOOR:   | CONCRETE     | SLF                                  | 0.68    |                     |         |
| BASEMENT TYPE:   | NONE         | R-BASEM.                             | 0.00    |                     |         |
| OVERHEAD DOOR TYPE:  | NONE         | R-ODOOR                              | 0.00    |                     |         |
| PERSONNEL DOOR TYPE:   | HOLLOW METAL | R-PDOOR                              | 1.81    |                     |         |

#### III. INFILTRATION:

|                                   |                       |        |    |                          |       |   |     |
|-----------------------------------|-----------------------|--------|----|--------------------------|-------|---|-----|
| iii. INFILTRATION:                |                       |        |    |                          |       |   |     |
| WINDOWS (LF of Crack)             | 120 X 0.33 Sq.In./LF= | Sq.In. | 40 | X CFM/Sq.In.             | 1.530 | = | 61  |
| PERSONNEL DOORS (SF)              | 462 X 0.16 Sq.In./SF= | Sq.In. | 74 | X CFM/Sq.In.             | 1.530 | = | 113 |
|                                   |                       |        |    |                          |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | 4  | X CFM / OPENING /HR      | 1.600 | = | 6   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | 8  | X CFM / OPENING /HR      | 1.385 | = | 11  |
|                                   |                       |        |    | TOTAL INFILTRATION (CFM) |       | = | 191 |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 462    | X DOOR "U"  | 0.552 | = | 255   |
| UA WALL             | = | WALL AREA   | 7,532  | X WALL "U"  | 0.084 | = | 631   |
| UA ROOF             | = | ROOF AREA   | 20,297 | X ROOF "U"  | 0.133 | = | 2,695 |
| UA GLASS            | = | GLASS AREA  | 328    | X GLASS "U" | 1.111 | = | 364   |
| UA SLAB             | = | SLAB PERIM. | 580    | X SLF       | 0.680 | = | 394   |
| UA BASEM.           | = | B-WALL AREA | 0      | X BASE "U"  | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 191    | X A. T. F.  | 1.037 | = | 198   |
| TOTAL UA (BTU/HR*F) |   |             |        |             |       |   | 4,538 |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |                   |
|----------------------|-------|------------|-------------------|
| BLDG NO:             | 814   | BLDG NAME: | MEDICAL FAC - NEW |
| BLDG FUNCTION:       |       |            |                   |
| FLOOR AREA: (SQ. FT) | 9,216 | # FLOORS:  | 1                 |
| SLAB PERIMETER: (FT) | 384   |            |                   |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST  | TOTAL  |
|---|----------|-------|----------------|----------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 1,056 | 1,056          | 1,056    | 1,056 | 4,224  |
| GLASS   | (SQ. FT) | 0     | 80             | 160      | 96    | 336    |
| PERSONNEL DOOR  | (SQ. FT) | 84    | 0              | 42       | 0     | 126    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0     | 0      |
| WALLS, NET  | (SQ. FT) | 972   | 976            | 854      | 960   | 3,762  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |       | 16,128 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) |       | 126    |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |       | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS           | R-VALUE |
|---------------------------------------|--------------|----------------------|---------|
|                                       | 1.           | OUTSIDE AIR FILM     | 0.17    |
|                                       | 2.           | 6" JUMBO BRICK       | 1.80    |
|                                       | 3.           | 1" AIR SPACE         | 1.00    |
|                                       | 4.           | 2" RIGID INSUL       | 5.56    |
|                                       | 5.           | 8' CMU               | 1.11    |
|                                       | 6.           |                      |         |
|                                       | 7.           | INSIDE AIR FILM      | 0.68    |
|                                       |              | TOTAL R-WALL =       | 10.32   |
|                                       |              | U=1/R                | 0.097   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS           | R-VALUE |
|                                       | 1.           | OUTSIDE AIR FILM     | 0.17    |
|                                       | 2.           | METAL ROOF           | 0.00    |
|                                       | 3.           | 5/8" COMPOSITE BOARD | 0.39    |
|                                       | 4.           | 1/2" COMPOSITE BOARD | 0.62    |
|                                       | 5.           | 3.6" PHENOLIC INSUL  | 32.25   |
|                                       | 6.           | METAL DECK           |         |
|                                       | 7.           | INSIDE AIR FILM      | 0.68    |
|                                       |              | TOTAL R-ROOF =       | 34.11   |
|                                       |              | U=1/R                | 0.029   |
| GLASS TYPE:                           | DOUBLE PANE  | R-GLASS              | 1.75    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                  | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.             | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR              | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR              | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |    |                          |       |   |    |
|-----------------------------------|-----------------------|--------|----|--------------------------|-------|---|----|
| WINDOWS (LF of Crack)             | 98 X 0.33 Sq.In./LF=  | Sq.In. | 32 | X CFM/Sq.In.             | 1.530 | = | 49 |
| PERSONNEL DOORS (SF)              | 126 X 0.16 Sq.In./SF= | Sq.In. | 20 | X CFM/Sq.In.             | 1.530 | = | 31 |
|                                   |                       |        |    |                          |       |   |    |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        |    | X CFM /OPENING /HR       | 1.600 | = | 0  |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | 4  | X CFM /OPENING /HR       | 1.385 | = | 6  |
|                                   |                       |        |    | TOTAL INFILTRATION (CFM) |       | = | 86 |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 126    | X DOOR "U"  | 0.552 | = | 70    |
| UA WALL             | = | WALL AREA   | 3,762  | X WALL "U"  | 0.097 | = | 365   |
| UA ROOF             | = | ROOF AREA   | 16,128 | X ROOF "U"  | 0.029 | = | 473   |
| UA GLASS            | = | GLASS AREA  | 336    | X GLASS "U" | 0.571 | = | 192   |
| UA SLAB             | = | SLAB PERIM. | 384    | X SLF       | 0.680 | = | 261   |
| UA BASEM.           | = | B-WALL AREA | 0      | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 86     | X A. T. F.  | 1.037 | = | 89    |
| TOTAL UA (BTU/HR°F) |   |             |        |             |       |   | 1,449 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                 |
|----------------------|--------|------------|-----------------|
| BLDG NO:             | 817    | BLDG NAME: | MNT HANGAR AVUM |
| BLDG FUNCTION:       |        |            |                 |
| FLOOR AREA: (SQ. FT) | 38,734 | # FLOORS:  | 1               |
| SLAB PERIMETER: (FT) | 897    |            |                 |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL  |
|---|----------|---------|----------------|----------|---------|--------|
| WALLS, GROSS  | (SQ. FT) | 4,698   | 13,253         | 16,683   | 4,698   | 39,332 |
| GLASS   | (SQ. FT) | 117     | 664            | 332      | 117     | 1,229  |
| PERSONNEL DOOR  | (SQ. FT) | 21      | 336            | 0        | 21      | 378    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 7,920    | 0       | 7,920  |
| WALLS, NET  | (SQ. FT) | 4,560   | 12,253         | 8,431    | 4,560   | 29,805 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 38,891 |
| OVERHEAD DOOR   | (SQ. FT) | 7,920   | PERSONNEL DOOR | (SQ. FT) |         | 378    |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL)          | COMPOSITES           | R-VALUE |
|--|----------------------|---------|
| COMPONENTS                                     | 1. SE WALL           | 10.71   |
| 4" FLUTED CMU = 1.17                           | 2. NW WALL           | 10.71   |
| 1" AIR SPACE = 1.0                             | 3. SW WALL           | 11.85   |
| 1" RIGID INSULATION = 4.0                      | 4. NE WALL           | 5.96    |
| 6" CMU = 1.29                                  | 5.                   |         |
| 3" RIBBED METAL PANELS W/3" BATT INSUL. = 11.0 | 6.                   |         |
| IA FILM = .68                                  | 7.                   |         |
| OA FILM = .17                                  | TOTAL R-WALL =       | 10.31   |
|  | U=1/R                | 0.097   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)           | COMPONENTS           | R-VALUE |
|  | 1. OUTSIDE AIR FILM  | 0.17    |
|  | 2. METAL DECK        | 0.00    |
|  | 3. 6" BLANKET INSUL. | 19.00   |
|  | 4.                   |         |
|  | 5.                   |         |
|  | 6.                   |         |
|  | 7. INSIDE AIR FILM   | 0.68    |
|  | TOTAL R-ROOF =       | 19.85   |
|  | U=1/R                | 0.050   |
| GLASS TYPE: DOUBLE PANE                        | R-GLASS              | 1.75    |
| SLAB TYPE FLOOR: CONCRETE                      | SLF                  | 0.68    |
| BASEMENT TYPE: NONE                            | R-BASEM.             | 0.00    |
| OVERHEAD DOOR TYPE: INSULATED METAL            | R-ODOOR              | 7.33    |
| PERSONNEL DOOR TYPE: HOLLOW METAL              | R-PDOOR              | 1.81    |

#### III. INFILTRATION:

|                                   |                        |        |                      |              |       |   |      |
|-----------------------------------|------------------------|--------|----------------------|--------------|-------|---|------|
| WINDOWS (LF of Crack)             | 1767 X 0.27 Sq.In./LF= | Sq.In. | 477                  | X CFM/Sq.In. | 1.530 | = | 730  |
| PERSONNEL DOORS (SF)              | 378 X 0.16 Sq.In./SF=  | Sq.In. | 60                   | X CFM/Sq.In. | 1.530 | = | 93   |
| OVERHEAD DOORS (SF)               |                        |        | 7920                 | X CFM/Sq.Ft. | 0.114 | = | 903  |
| DOOR OPENINGS / HR - SINGLE DOOR  |                        | 4      | X CFM / OPENING / HR |              | 1.600 | = | 6    |
| DOOR OPENINGS / HR - DOUBLE DOORS |                        | 4      | X CFM / OPENING / HR |              | 1.385 | = | 6    |
| TOTAL INFILTRATION (CFM)          |                        |        |                      |              |       | = | 1737 |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 7,920  | X DOOR "U"  | 0.136 | = | 1,080 |
| UA PDOOR            | = | PDOOR AREA  | 378    | X DOOR "U"  | 0.552 | = | 209   |
| UA WALL             | = | WALL AREA   | 29,805 | X WALL "U"  | 0.097 | = | 2,892 |
| UA ROOF             | = | ROOF AREA   | 38,891 | X ROOF "U"  | 0.050 | = | 1,959 |
| UA GLASS            | = | GLASS AREA  | 1,229  | X GLASS "U" | 0.571 | = | 702   |
| UA SLAB             | = | SLAB PERIM. | 897    | X SLF       | 0.680 | = | 610   |
| UA BASEM.           | = | B-WALL AREA | 0      | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 1737   | X A. T. F.  | 1.037 | = | 1,802 |
| TOTAL UA (BTU/HR*F) |   |             |        |             |       |   | 9,255 |

E M C ENGINEERS, INC.  
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 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                 |
|----------------------|--------|------------|-----------------|
| BLDG NO:             | 833    | BLDG NAME: | MNT HANGAR AVUM |
| BLDG FUNCTION:       |        |            |                 |
| FLOOR AREA: (SQ. FT) | 50,127 | # FLOORS:  | 1               |
| SLAB PERIMETER: (FT) | 1,013  |            |                 |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL  |
|---|----------|---------|----------------|----------|---------|--------|
| WALLS, GROSS  | (SQ. FT) | 14,880  | 5,025          | 18,124   | 5,025   | 43,054 |
| GLASS   | (SQ. FT) | 135     | 744            | 0        | 135     | 1,014  |
| PERSONNEL DOOR  | (SQ. FT) | 27      | 386            | 0        | 27      | 440    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 8,640    | 0       | 8,640  |
| WALLS, NET  | (SQ. FT) | 14,718  | 3,895          | 9,484    | 4,863   | 32,960 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 50,320 |
| OVERHEAD DOOR   | (SQ. FT) | 8,640   | PERSONNEL DOOR | (SQ. FT) |         | 440    |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL)          |                 | COMPOSITES           | R-VALUE |
|--|-----------------|----------------------|---------|
| COMPONENTS                                     |                 | 1. SE WALL           | 10.71   |
| 4" FLUTED CMU = 1.17                           |                 | 2. NW WALL           | 10.71   |
| 1" AIR SPACE = 1.0                             |                 | 3. SW WALL           | 11.85   |
| 1" RIGID INSULATION = 4.0                      |                 | 4. NE WALL           | 5.96    |
| 6" CMU = 1.29                                  |                 | 5.                   |         |
| 3" RIBBED METAL PANELS W/3" BATT INSUL. = 11.0 |                 | 6.                   |         |
| IA FILM = .68                                  |                 | 7.                   |         |
| OA FILM = .17                                  |                 | TOTAL R-WALL =       | 10.34   |
|  |                 | U=1/R                | 0.097   |
|  |                 |                      |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)           |                 | COMPONENTS           | R-VALUE |
|  |                 | 1. OUTSIDE AIR FILM  | 0.17    |
|  |                 | 2. METAL DECK        | 0.00    |
|  |                 | 3. 6" BLANKET INSUL. | 19.00   |
|  |                 | 4.                   |         |
|  |                 | 5.                   |         |
|  |                 | 6.                   |         |
|  |                 | 7. INSIDE AIR FILM   | 0.68    |
|  |                 | TOTAL R-ROOF =       | 19.85   |
|  |                 | U=1/R                | 0.050   |
|  |                 |                      |         |
| GLASS TYPE:                                    | DOUBLE PANE     | R-GLASS              | 1.75    |
| SLAB TYPE FLOOR:                               | CONCRETE        | SLF                  | 0.68    |
| BASEMENT TYPE:                                 | NONE            | R-BASEM.             | 0.00    |
| OVERHEAD DOOR TYPE:                            | INSULATED METAL | R-ODOOR              | 7.33    |
| PERSONNEL DOOR TYPE:                           | HOLLOW METAL    | R-PDOOR              | 1.81    |

#### III. INFILTRATION:

|                                   |                        |        |                          |              |       |   |      |
|-----------------------------------|------------------------|--------|--------------------------|--------------|-------|---|------|
| WINDOWS (LF of Crack)             | 1267 X 0.27 Sq.In./LF= | Sq.In. | 342                      | X CFM/Sq.In. | 1.530 | = | 523  |
| PERSONNEL DOORS (SF)              | 440 X 0.16 Sq.In./SF=  | Sq.In. | 70                       | X CFM/Sq.In. | 1.530 | = | 108  |
| OVERHEAD DOORS (SF)               |                        |        | 8640                     | X CFM/Sq.Ft. | 0.114 | = | 985  |
| DOOR OPENINGS / HR - SINGLE DOOR  |                        | 4      | X CFM /OPENING /HR       | 1.600        | =     | 6 |      |
| DOOR OPENINGS / HR - DOUBLE DOORS |                        | 4      | X CFM /OPENING /HR       | 1.385        | =     | 6 |      |
|                                   |                        |        | TOTAL INFILTRATION (CFM) |              | =     |   | 1628 |

|              |   |             |        |                     |       |   |        |
|--------------|---|-------------|--------|---------------------|-------|---|--------|
| UA ODOOR     | = | ODOOR AREA  | 8,640  | X DOOR "U"          | 0.136 | = | 1,179  |
| UA PDOOR     | = | PDOOR AREA  | 440    | X DOOR "U"          | 0.552 | = | 243    |
| UA WALL      | = | WALL AREA   | 32,960 | X WALL "U"          | 0.097 | = | 3,188  |
| UA ROOF      | = | ROOF AREA   | 50,320 | X ROOF "U"          | 0.050 | = | 2,535  |
| UA GLASS     | = | GLASS AREA  | 1,014  | X GLASS "U"         | 0.571 | = | 579    |
| UA SLAB      | = | SLAB PERIM. | 1,013  | X SLF               | 0.680 | = | 689    |
| UA BASEM.    | = | B-WALL AREA | 0      | X BASE. "U"         | 0.000 | = | 0      |
| INFILTRATION | = | CFM         | 1628   | X A. T. F.          | 1.037 | = | 1,688  |
|              |   |             |        | TOTAL UA (BTU/HR°F) |       |   | 10,102 |

E M C ENGINEERS, INC.  
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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |              |
|----------------------|--------|------------|--------------|
| BLDG NO:             | 835    | BLDG NAME: | MAF OPS BLDG |
| BLDG FUNCTION:       |        |            |              |
| FLOOR AREA: (SQ. FT) | 19,448 | # FLOORS:  | 1            |
| SLAB PERIMETER: (FT) | 582    |            |              |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST  | TOTAL  |
|---|----------|-------|----------------|----------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 2,132 | 2,132          | 2,618    | 2,618 | 9,500  |
| GLASS   | (SQ. FT) | 0     | 0              | 0        | 328   | 328    |
| PERSONNEL DOOR  | (SQ. FT) | 0     | 0              | 378      | 84    | 462    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0     | 0      |
| WALLS, NET  | (SQ. FT) | 2,132 | 2,132          | 2,240    | 2,206 | 8,710  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |       | 22,248 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) | 462   |        |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |       | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

II. CONSTRUCTION: ( [ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS              | R-VALUE |
|---------------------------------------|--------------|-------------------------|---------|
|                                       |              | 1. OUTSIDE AIR FILM     | 0.17    |
|                                       |              | 2. 6" JUMBO BRICK       | 1.80    |
|                                       |              | 3. 2" INSULATION        | 8.00    |
|                                       |              | 4. 6" CMU               | 1.29    |
|                                       |              | 5.                      |         |
|                                       |              | 6.                      |         |
|                                       |              | 7. INSIDE AIR FILM      | 0.68    |
|                                       |              | TOTAL R-WALL =          | 11.94   |
|                                       |              | U=1/R                   | 0.084   |
|                                       |              |                         |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS              | R-VALUE |
|                                       |              | 1. OUTSIDE AIR FILM     | 0.17    |
|                                       |              | 2. SHINGLES             | 0.44    |
|                                       |              | 3. 2" RIGID INSULATION  | 5.56    |
|                                       |              | 4. 1/2" PLYWOOD SHEATHI | 0.62    |
|                                       |              | 5. AIR SPACE            | 1.00    |
|                                       |              | 6. ACU CEILING          | 1.25    |
|                                       |              | 7. INSIDE AIR FILM      | 0.68    |
|                                       |              | TOTAL R-ROOF =          | 9.72    |
|                                       |              | U=1/R                   | 0.103   |
|                                       |              |                         |         |
| GLASS TYPE:                           | DOUBLE PANE  | R-GLASS                 | 1.75    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                     | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.                | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR                 | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR                 | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                    |                          |       |       |     |    |
|-----------------------------------|-----------------------|--------|--------------------|--------------------------|-------|-------|-----|----|
| IN INFILTRATION:                  |                       |        |                    |                          |       |       |     |    |
| WINDOWS (LF of Crack)             | 160 X 0.27 Sq.In./LF= | Sq.In. | 43                 | X CFM/Sq.In.             | 1.530 | =     | 66  |    |
| PERSONNEL DOORS (SF)              | 462 X 0.16 Sq.In./SF= | Sq.In. | 74                 | X CFM/Sq.In.             | 1.530 | =     | 113 |    |
|                                   |                       |        |                    |                          |       |       |     |    |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM /OPENING /HR |                          | 1.600 | =     | 0   |    |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | 12                 | X CFM /OPENING /HR       |       | 1.385 | =   | 17 |
|                                   |                       |        |                    | TOTAL INFILTRATION (CFM) |       | =     | 196 |    |

|              |   |             |        |                     |       |   |       |
|--------------|---|-------------|--------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 0      | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 462    | X DOOR "U"          | 0.552 | = | 255   |
| UA WALL      | = | WALL AREA   | 8,710  | X WALL "U"          | 0.084 | = | 729   |
| UA ROOF      | = | ROOF AREA   | 22,248 | X ROOF "U"          | 0.103 | = | 2,289 |
| UA GLASS     | = | GLASS AREA  | 328    | X GLASS "U"         | 0.571 | = | 187   |
| UA SLAB      | = | SLAB PERIM. | 582    | X SLF               | 0.680 | = | 396   |
| UA BASEM.    | = | B-WALL AREA | 0      | X BASE. "U"         | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 196    | X A. T. F.          | 1.037 | = | 203   |
|              |   |             |        | TOTAL UA (BTU/HR*F) |       |   | 4,060 |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |                  |
|----------------------|-------|------------|------------------|
| BLDG NO:             | 840   | BLDG NAME: | VEH MNT SHOP ORG |
| BLDG FUNCTION:       |       |            |                  |
| FLOOR AREA: (SQ. FT) | 9,545 | # FLOORS:  | 1                |
| SLAB PERIMETER: (FT) | 396   |            |                  |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST  | TOTAL |
|---|----------|-------|----------------|----------|-------|-------|
| WALLS, GROSS  | (SQ. FT) | 2,760 | 2,760          | 1,992    | 1,992 | 9,504 |
| GLASS   | (SQ. FT) | 152   | 152            | 0        | 0     | 304   |
| PERSONNEL DOOR  | (SQ. FT) | 84    | 84             | 84       | 0     | 252   |
| OVERHEAD DOOR   | (SQ. FT) | 1,260 | 1,260          | 0        | 0     | 2,520 |
| WALLS, NET  | (SQ. FT) | 1,264 | 1,264          | 1,908    | 1,992 | 6,428 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |       | 9,545 |
| OVERHEAD DOOR   | (SQ. FT) | 2,520 | PERSONNEL DOOR | (SQ. FT) |       | 252   |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |       | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS         | R-VALUE |
|---------------------------------------|--------------|--------------------|---------|
|                                       | 1.           | OUTSIDE AIR FILM   | 0.17    |
|                                       | 2.           | INSUL. METAL PANEL | 8.34    |
|                                       | 3.           |                    |         |
|                                       | 4.           |                    |         |
|                                       | 5.           |                    |         |
|                                       | 6.           |                    |         |
|                                       | 7.           | INSIDE AIR FILM    | 0.68    |
|                                       |              | TOTAL R-WALL =     | 9.19    |
|                                       |              | U=1/R              | 0.109   |
|                                       |              |                    |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS         | R-VALUE |
|                                       | 1.           | OUTSIDE AIR FILM   | 0.17    |
|                                       | 2.           | BUR                | 0.33    |
|                                       | 3.           | 2" RIGID INSUL.    | 5.56    |
|                                       | 4.           |                    |         |
|                                       | 5.           |                    |         |
|                                       | 6.           |                    |         |
|                                       | 7.           | INSIDE AIR FILM    | 0.68    |
|                                       |              | TOTAL R-ROOF =     | 6.74    |
|                                       |              | U=1/R              | 0.148   |
|                                       |              |                    |         |
| GLASS TYPE:                           | DOUBLE PANE  | R-GLASS            | 1.75    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.           | 0.00    |
| OVERHEAD DOOR TYPE:                   | INSUL. METAL | R-ODOOR            | 7.33    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR            | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                          |              |       |     |     |
|-----------------------------------|-----------------------|--------|--------------------------|--------------|-------|-----|-----|
| WINDOWS (LF of Crack)             | 224 X 0.27 Sq.In./LF= | Sq.In. | 60                       | X CFM/Sq.In. | 1.530 | =   | 93  |
| PERSONNEL DOORS (SF)              | 252 X 0.16 Sq.In./SF= | Sq.In. | 40                       | X CFM/Sq.In. | 1.530 | =   | 62  |
| OVERHEAD DOORS (SF)               |                       |        | 2520                     | X CFM/Sq.Ft. | 0.228 | =   | 575 |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       | 4      | X CFM /OPENING /HR       | 1.600        | =     | 6   |     |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       | 4      | X CFM /OPENING /HR       | 1.385        | =     | 6   |     |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |              | =     | 741 |     |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 2,520 | X DOOR "U"  | 0.136 | = | 344   |
| UA PDOOR            | = | PDOOR AREA  | 252   | X DOOR "U"  | 0.552 | = | 139   |
| UA WALL             | = | WALL AREA   | 6,428 | X WALL "U"  | 0.109 | = | 699   |
| UA ROOF             | = | ROOF AREA   | 9,545 | X ROOF "U"  | 0.148 | = | 1,416 |
| UA GLASS            | = | GLASS AREA  | 304   | X GLASS "U" | 0.571 | = | 174   |
| UA SLAB             | = | SLAB PERIM. | 396   | X SLF       | 0.680 | = | 269   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 741   | X A. T. F.  | 1.037 | = | 768   |
| TOTAL UA (BTU/HR°F) |   |             |       |             |       |   | 3,810 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |               |
|----------------------|--------|------------|---------------|
| BLDG NO:             | 4010   | BLDG NAME: | DENTAL CLINIC |
| BLDG FUNCTION:       |        |            |               |
| FLOOR AREA: (SQ. FT) | 15,587 | # FLOORS:  | 1             |
| SLAB PERIMETER: (FT) | 504    |            |               |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST  | TOTAL  |
|---|----------|-------|----------------|----------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 1,859 | 1,859          | 1,417    | 1,417 | 6,552  |
| GLASS   | (SQ. FT) | 208   | 384            | 96       | 32    | 720    |
| PERSONNEL DOOR  | (SQ. FT) | 0     | 42             | 42       | 98    | 182    |
| OVERHEAD DOOR   | (SQ. FT) |       |                |          |       | 0      |
| WALLS, NET  | (SQ. FT) | 1,651 | 1,433          | 1,279    | 1,287 | 5,650  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |       | 15,587 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) |       | 182    |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |       | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|   |              |                       |         |
|---|--------------|-----------------------|---------|
| II. CONSTRUCTION: ( [ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES ) |              |                       |         |
| WALLS: (SKETCH CROSS SECTION OF WALL)                                   |              | COMPONENTS            | R-VALUE |
|   |              | 1. OUTSIDE AIR FILM   | 0.17    |
|   |              | 2. 4" BRICK           | 1.20    |
|   |              | 3. MTL FRAMING W/BATT | 12.00   |
|   |              | 4. 6" CMU             | 0.92    |
|   |              | 5.                    |         |
|   |              | 6.                    |         |
|   |              | 7. INSIDE AIR FILM    | 0.68    |
|   |              | TOTAL R-WALL =        |         |
| U=1/R   |              | 0.067                 |         |
|   |              |                       |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                    |              | COMPONENTS            | R-VALUE |
|   |              | 1. OUTSIDE AIR FILM   | 0.17    |
|   |              | 2. MTL ROOFING        | 0.00    |
|   |              | 3. 4" RIGID INSUL     | 11.12   |
|   |              | 4. FELT UNDERLAYMENT  | 0.06    |
|   |              | 5. MTL. DECKING       | 0.00    |
|   |              | 6.                    |         |
|   |              | 7. INSIDE AIR FILM    | 0.68    |
|   |              | TOTAL R-ROOF =        |         |
| U=1/R   |              | 0.083                 |         |
|   |              |                       |         |
| GLASS TYPE:   | DOUBLE PANE  | R-GLASS               | 1.75    |
| SLAB TYPE FLOOR:  | CONCRETE     | SLF                   | 0.68    |
| BASEMENT TYPE:  | NONE         | R-BASEM.              | 0.00    |
| OVERHEAD DOOR TYPE:   | NONE         | R-ODOOR               | 0.00    |
| PERSONNEL DOOR TYPE:  | HOLLOW METAL | R-PDOOR               | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                     |                     |       |   |     |
|-----------------------------------|-----------------------|--------|---------------------|---------------------|-------|---|-----|
| iii. INFILTRATION:                |                       |        |                     |                     |       |   |     |
| WINDOWS (LF of Crack)             | 258 X 0.33 Sq.In./LF= | Sq.In. | 85                  | X CFM/Sq.In.        | 1.530 | = | 130 |
| PERSONNEL DOORS (SF)              | 182 X 0.16 Sq.In./SF= | Sq.In. | 29                  | X CFM/Sq.In.        | 1.530 | = | 45  |
|                                   |                       |        |                     |                     |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM / OPENING /HR |                     | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | 4                   | X CFM / OPENING /HR | 1.385 | = | 6   |
| TOTAL INFILTRATION (CFM)          |                       |        |                     |                     |       | = | 180 |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 182    | X DOOR "U"  | 0.552 | = | 101   |
| UA WALL             | = | WALL AREA   | 5,650  | X WALL "U"  | 0.067 | = | 377   |
| UA ROOF             | = | ROOF AREA   | 15,587 | X ROOF "U"  | 0.083 | = | 1,296 |
| UA GLASS            | = | GLASS AREA  | 720    | X GLASS "U" | 0.571 | = | 411   |
| UA SLAB             | = | SLAB PERIM. | 504    | X SLF       | 0.680 | = | 343   |
| UA BASEM.           | = | B-WALL AREA | 0      | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 180    | X A. T. F.  | 1.037 | = | 187   |
| TOTAL UA (BTU/HR*F) |   |             |        |             |       |   | 2,715 |



E M C ENGINEERS, INC.  
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 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 18-Jul-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                     |        |            |             |
|---------------------|--------|------------|-------------|
| BLDG NO:            | 5302   | BLDG NAME: | POST OFFICE |
| BLDG FUNCTION:      |        |            |             |
| FLOOR AREA (SQ. FT) | 10,450 | # FLOORS:  | 1           |
| SLAB PERIMETER (FT) | 410    |            |             |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST  | TOTAL  |
|---|----------|-------|----------------|----------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 1,630 | 1,630          | 1,888    | 1,888 | 7,036  |
| GLASS   | (SQ. FT) | 0     | 0              | 0        | 198   | 198    |
| PERSONNEL DOOR  | (SQ. FT) | 63    | 21             | 189      | 0     | 273    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0     | 0      |
| WALLS, NET  | (SQ. FT) | 1,567 | 1,609          | 1,699    | 1,690 | 6,565  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |       | 10,450 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) |       | 273    |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |       | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL)                                  |              | COMPONENTS          | R-VALUE |
|--|--------------|---------------------|---------|
| COMPOSITE:<br>4" FACE BRICK = 1.2<br>4" PRE-CAST CONCRETE PANELS = .72 |              | 1. OUTSIDE AIR FILM | 0.17    |
|  |              | 2. COMPOSITE        | 1.05    |
|  |              | 3. 2" AIR SPACE     | 1.00    |
|  |              | 4. 2" RIGID INSUL.  | 5.56    |
|  |              | 5. 8" CMU           | 1.11    |
|  |              | 6.                  |         |
|  |              | 7. INSIDE AIR FILM  | 0.68    |
|  |              | TOTAL R-WALL =      |         |
| U=1/R  |              | 0.104               |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                   |              | COMPONENTS          | R-VALUE |
|  |              | 1. OUTSIDE AIR FILM | 0.17    |
|  |              | 2. BUR              | 0.33    |
|  |              | 3. GRAVEL           | 0.33    |
|  |              | 4. 2" RIGID INSUL   | 5.56    |
|  |              | 5.                  |         |
|  |              | 6.                  |         |
|  |              | 7. INSIDE AIR FILM  | 0.68    |
|  |              | TOTAL R-ROOF =      |         |
| U=1/R  |              | 0.141               |         |
| GLASS TYPE:  | SINGLE PANE  | R-GLASS             | 0.90    |
| SLAB TYPE FLOOR:   | CONCRETE     | SLF                 | 0.68    |
| BASEMENT TYPE:   | NONE         | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE:  | NONE         | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE:   | HOLLOW METAL | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |    |                          |       |     |    |
|-----------------------------------|-----------------------|--------|----|--------------------------|-------|-----|----|
| WINDOWS (LF of Crack)             | 99 X 0.33 Sq.In./LF=  | Sq.In. | 33 | X CFM/Sq.In.             | 1.530 | =   | 50 |
| PERSONNEL DOORS (SF)              | 273 X 0.16 Sq.In./SF= | Sq.In. | 44 | X CFM/Sq.In.             | 1.530 | =   | 67 |
|                                   |                       |        |    |                          |       |     |    |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        |    | X CFM /OPENING /HR       | 1.600 | =   | 0  |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        |    | X CFM /OPENING /HR       | 1.385 | =   | 0  |
|                                   |                       |        |    | TOTAL INFILTRATION (CFM) | =     | 117 |    |

|              |   |             |        |                     |       |   |       |
|--------------|---|-------------|--------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 0      | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 273    | X DOOR "U"          | 0.552 | = | 151   |
| UA WALL      | = | WALL AREA   | 6,565  | X WALL "U"          | 0.104 | = | 686   |
| UA ROOF      | = | ROOF AREA   | 10,450 | X ROOF "U"          | 0.141 | = | 1,478 |
| UA GLASS     | = | GLASS AREA  | 198    | X GLASS "U"         | 1.111 | = | 220   |
| UA SLAB      | = | SLAB PERIM. | 410    | X SLF               | 0.680 | = | 279   |
| UA BASEM     | = | B-WALL AREA | 0      | X BASE. "U"         | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 117    | X A. T. F.          | 0.852 | = | 100   |
|              |   |             |        | TOTAL UA (BTU/HR°F) |       |   | 2,913 |

E M C ENGINEERS, INC.  
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 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |          |            |             |
|----------------------|----------|------------|-------------|
| BLDG NO:             | 5309     | BLDG NAME: | GUEST HOUSE |
| BLDG FUNCTION:       | QUARTERS |            |             |
| FLOOR AREA: (SQ. FT) | 21,067   | # FLOORS:  | 3           |
| SLAB PERIMETER: (FT) | 392      |            |             |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST  | TOTAL  |
|---|----------|-------|----------------|----------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 5,199 | 5,199          | 1,073    | 1,073 | 12,544 |
| GLASS   | (SQ. FT) | 1,166 | 1,156          | 74       | 24    | 2,419  |
| PERSONNEL DOOR  | (SQ. FT) | 0     | 42             | 0        | 28    | 70     |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0     | 0      |
| WALLS, NET  | (SQ. FT) | 4,033 | 4,001          | 1,000    | 1,021 | 10,055 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |       | 7,498  |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) | 70    |        |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |       | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|  |                             |                       |         |
|--|-----------------------------|-----------------------|---------|
| II. CONSTRUCTION: (1 ) FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPE: |                             |                       |         |
| WALLS: (SKETCH CROSS SECTION OF WALL)                                |                             | COMPONENTS            | R-VALUE |
|  | 1.                          | OUTSIDE AIR FILM      | 0.17    |
|  | 2.                          | 4" BRICK              | 1.20    |
|  | 3.                          | 2" AIR SPACE          | 1.00    |
|  | 4.                          | 8" CMU                | 1.11    |
|  | 5.                          |                       |         |
|  | 6.                          |                       |         |
|  | 7.                          | INSIDE AIR FILM       | 0.68    |
|  |                             | TOTAL R-WALL =        | 4.16    |
|  |                             | U=1/R                 | 0.240   |
|  |                             |                       |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                 |                             | COMPONENTS            | R-VALUE |
|  | 1.                          | OUTSIDE AIR FILM      | 0.17    |
|  | 2.                          | BUR                   | 0.33    |
|  | 3.                          | 2.5" CONCRETE DECK    | 0.21    |
|  | 4.                          | 2.5: RIGID INSUL.     | 6.95    |
|  | 5.                          | AIR SPACE             | 1.00    |
|  | 6.                          | ACOUSTIC TILE CEILING | 1.79    |
|  | 7.                          | INSIDE AIR FILM       | 0.61    |
|  |                             | TOTAL R-ROOF =        | 11.06   |
|  |                             | U=1/R                 | 0.090   |
|  |                             |                       |         |
| GLASS TYPE:  | DOUBLE PANE IN METAL FRAMES | R-GLASS               | 1.00    |
| SLAB TYPE FLOOR:   | CONCRETE                    | SLF                   | 0.83    |
| BASEMENT TYPE:   | CONCRETE                    | R-BASEM.              | 10.00   |
| OVERHEAD DOOR TYPE:  | NONE                        | R-ODOOR               | 0.00    |
| PERSONNEL DOOR TYPE:   | HOLLOW METAL                | R-PDOOR               | 1.81    |

#### III. INFILTRATION:

|                                   |                        |                      |       |                          |       |     |     |
|-----------------------------------|------------------------|----------------------|-------|--------------------------|-------|-----|-----|
| WINDOWS (LF of Crack)             | 1224 X 0.33 Sq.In./LF= | Sq.In.               | 404   | X CFM/Sq.In.             | 1.530 | =   | 618 |
| PERSONNEL DOORS (SF)              | 70 X 0.16 Sq.In./SF=   | Sq.In.               | 11    | X CFM/Sq.In.             | 1.530 | =   | 17  |
|                                   |                        |                      |       |                          |       |     |     |
| DOOR OPENINGS / HR - SINGLE DOOR  | 4                      | X CFM / OPENING / HR | 1.600 | =                        | 6     |     |     |
| DOOR OPENINGS / HR - DOUBLE DOORS | 8                      | X CFM / OPENING / HR | 1.385 | =                        | 11    |     |     |
|                                   |                        |                      |       | TOTAL INFILTRATION (CFM) | =     | 653 |     |

|              |   |             |        |                     |       |       |       |
|--------------|---|-------------|--------|---------------------|-------|-------|-------|
| UA ODOOR     | = | ODOOR AREA  | 0      | X DOOR "U"          | 0.000 | =     | 0     |
| UA PDOOR     | = | PDOOR AREA  | 70     | X DOOR "U"          | 0.552 | =     | 39    |
| UA WALL      | = | WALL AREA   | 10,055 | X WALL "U"          | 0.240 | =     | 2,417 |
| UA ROOF      | = | ROOF AREA   | 7,498  | X ROOF "U"          | 0.090 | =     | 678   |
| UA GLASS     | = | GLASS AREA  | 2,419  | X GLASS "U"         | 1.000 | =     | 2,419 |
| UA SLAB      | = | SLAB PERIM. | 392    | X SLF               | 0.830 | =     | 326   |
| UA BASEM.    | = | B-WALL AREA | 0      | X BASE. "U"         | 0.100 | =     | 0     |
| INFILTRATION | = | CFM         | 653    | X A. T. F.          | 1.037 | =     | 677   |
|              |   |             |        | TOTAL UA (BTU/HR°F) | =     | 6,555 |       |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                    |
|----------------------|--------|------------|--------------------|
| BLDG NO:             | 5315   | BLDG NAME: | MORRIS HILL CHAPEL |
| BLDG FUNCTION:       | CHAPEL |            |                    |
| FLOOR AREA: (SQ. FT) | 22,744 | # FLOORS:  | 1                  |
| SLAB PERIMETER: (FT) | 1,181  |            |                    |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W | SOUTH-E  | TOTAL           |
|---|----------|---------|----------------|---------|----------|-----------------|
| WALLS, GROSS  | (SQ. FT) | 4,368   | 4,344          | 4,128   | 1,704    | 14,544          |
| GLASS   | (SQ. FT) | 150     | 166            | 275     | 66       | 657             |
| PERSONNEL DOOR  | (SQ. FT) | 0       | 84             | 126     | 84       | 294             |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0       | 0        | 0               |
| WALLS, NET  | (SQ. FT) | 4,218   | 4,094          | 3,727   | 1,554    | 13,593          |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) |          |         |                |         |          | (SQ. FT) 25,782 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR |         | (SQ. FT) | 294             |
| BASEMENT WALLS  | (SQ. FT) |         |                |         |          | 0               |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS           | R-VALUE |
|---------------------------------------|--------------|----------------------|---------|
|                                       | 1.           | OUTSIDE AIR FILM     | 0.17    |
|                                       | 2.           | 4" BRICK             | 1.20    |
|                                       | 3.           | 2" RIGID INSUL       | 5.56    |
|                                       | 4.           | AIR SPACE            | 1.00    |
|                                       | 5.           | 8" CMU               | 1.11    |
|                                       | 6.           | 1/2" GYPSUM BD.      | 0.45    |
|                                       | 7.           | INSIDE AIR FILM      | 0.68    |
|                                       |              | TOTAL R-WALL =       | 10.17   |
|                                       | U=1/R        | 0.098                |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS           | R-VALUE |
|                                       | 1.           | OUTSIDE AIR FILM     | 0.17    |
|                                       | 2.           | SHINGLES             | 0.44    |
|                                       | 3.           | 2" RIGID INSUL       | 5.56    |
|                                       | 4.           | 1/2" PLYWOOD SHEATHI | 0.62    |
|                                       | 5.           | 1/2" GYPSUM BOARD    | 0.45    |
|                                       | 6.           |                      |         |
|                                       | 7.           | INSIDE AIR FILM      | 0.68    |
|                                       |              | TOTAL R-ROOF =       | 7.92    |
|                                       | U=1/R        | 0.126                |         |
| GLASS TYPE:                           | SINGLE PANE  | R-GLASS              | 0.90    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                  | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.             | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR              | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR              | 1.81    |

#### III. INFILTRATION:

|                                   |                          |        |    |              |       |     |     |
|-----------------------------------|--------------------------|--------|----|--------------|-------|-----|-----|
| WINDOWS (LF of Crack)             | 230 X 0.33 Sq.In./LF=    | Sq.In. | 76 | X CFM/Sq.In. | 1.530 | =   | 116 |
| PERSONNEL DOORS (SF)              | 294 X 0.16 Sq.In./SF=    | Sq.In. | 47 | X CFM/Sq.In. | 1.530 | =   | 72  |
|                                   |                          |        |    |              |       |     |     |
| DOOR OPENINGS / HR - SINGLE DOOR  | X CFM /OPENING /HR       |        |    | 1.600        | =     | 0   |     |
| DOOR OPENINGS / HR - DOUBLE DOORS | 2 X CFM /OPENING /HR     |        |    | 1.385        | =     | 3   |     |
|                                   | TOTAL INFILTRATION (CFM) |        |    |              | =     | 191 |     |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 294    | X DOOR "U"  | 0.552 | = | 162   |
| UA WALL             | = | WALL AREA   | 13,593 | X WALL "U"  | 0.098 | = | 1,337 |
| UA ROOF             | = | ROOF AREA   | 25,782 | X ROOF "U"  | 0.126 | = | 3,255 |
| UA GLASS            | = | GLASS AREA  | 657    | X GLASS "U" | 1.111 | = | 730   |
| UA SLAB             | = | SLAB PERIM. | 1,181  | X SLF       | 0.680 | = | 803   |
| UA BASEM.           | = | B-WALL AREA | 0      | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 191    | X A. T. F.  | 1.037 | = | 198   |
| TOTAL UA (BTU/HR°F) |   |             |        |             |       |   | 6,485 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 18-Jul-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |              |
|----------------------|--------|------------|--------------|
| BLDG NO:             | 5800   | BLDG NAME: | YOUTH CENTER |
| BLDG FUNCTION:       |        |            |              |
| FLOOR AREA: (SQ. FT) | 16,497 | # FLOORS:  | 1            |
| SLAB PERIMETER: (FT) | 655    |            |              |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST  | TOTAL  |
|---|----------|-------|----------------|----------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 3,302 | 3,302          | 1,977    | 1,977 | 10,557 |
| GLASS   | (SQ. FT) | 0     | 240            | 192      | 72    | 504    |
| PERSONNEL DOOR  | (SQ. FT) | 105   | 42             | 42       | 42    | 231    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0     | 0      |
| WALLS, NET  | (SQ. FT) | 3,197 | 3,020          | 1,743    | 1,863 | 9,822  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |       | 18,922 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) |       | 231    |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |       | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|  |              |                     |         |
|--|--------------|---------------------|---------|
| II. CONSTRUCTION: (1) FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPE |              |                     |         |
| WALLS: (SKETCH CROSS SECTION OF WALL)                              |              | COMPONENTS          | R-VALUE |
|  |              | 1. OUTSIDE AIR FILM | 0.17    |
|  |              | 2. 4" FACE BRICK    | 1.20    |
|  |              | 3. AIR SPACE        | 1.00    |
|  |              | 4. 2" RIGID INSUL.  | 5.56    |
|  |              | 5. 8" CMU           | 1.11    |
|  |              | 6.                  |         |
|  |              | 7. INSIDE AIR FILM  | 0.68    |
|  |              | TOTAL R-WALL =      |         |
| U=1/R  |              | 0.103               |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                               |              | COMPONENTS          | R-VALUE |
|  |              | 1. OUTSIDE AIR FILM | 0.17    |
|  |              | 2. 12 GA PURLING    | 16.68   |
|  |              | 3. METAL DECK       | 0.00    |
|  |              | 4. 2" RIGID INSUL.  | 5.56    |
|  |              | 5.                  |         |
|  |              | 6.                  |         |
|  |              | 7. INSIDE AIR FILM  | 0.68    |
|  |              | TOTAL R-ROOF =      |         |
| U=1/R  |              | 0.043               |         |
| GLASS TYPE:  | DOUBLE PANE  | R-GLASS             | 1.75    |
| SLAB TYPE FLOOR:   | CONCRETE     | SLF                 | 0.68    |
| BASEMENT TYPE:   | NONE         | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE:  | NONE         | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE:   | HOLLOW METAL | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                       |                      |       |              |       |   |    |
|-----------------------------------|-----------------------|----------------------|-------|--------------|-------|---|----|
| WINDOWS (LF of Crack)             | 30 X 0.27 Sq.In./LF=  | Sq.In.               | 8     | X CFM/Sq.In. | 1.530 | = | 12 |
| PERSONNEL DOORS (SF)              | 231 X 0.16 Sq.In./SF= | Sq.In.               | 37    | X CFM/Sq.In. | 1.530 | = | 57 |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       | X CFM / OPENING / HR | 1.600 | =            |       |   | 0  |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       | X CFM / OPENING / HR | 1.385 | =            |       |   | 0  |
| TOTAL INFILTRATION (CFM)          |                       |                      |       |              |       | = | 69 |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 231    | X DOOR "U"  | 0.552 | = | 128   |
| UA WALL             | = | WALL AREA   | 9,822  | X WALL "U"  | 0.103 | = | 1,010 |
| UA ROOF             | = | ROOF AREA   | 18,922 | X ROOF "U"  | 0.043 | = | 819   |
| UA GLASS            | = | GLASS AREA  | 504    | X GLASS "U" | 0.571 | = | 288   |
| UA SLAB             | = | SLAB PERIM. | 655    | X SLF       | 0.680 | = | 445   |
| UA BASEM.           | = | B-WALL AREA | 0      | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 69     | X A. T. F.  | 0.852 | = | 59    |
| TOTAL UA (BTU/HR°F) |   |             |        |             |       |   | 2,750 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 18-Jul-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |           |
|----------------------|--------|------------|-----------|
| BLDG NO.             | 6620   | BLDG NAME: | OPEN MESS |
| BLDG FUNCTION:       |        |            |           |
| FLOOR AREA: (SQ. FT) | 27,860 | # FLOORS:  | 1         |
| SLAB PERIMETER: (FT) | 827    |            |           |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH | EAST  | WEST  | TOTAL  |
|---|----------|-------|-------|-------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 3,068 | 3,328 | 2,180 | 2,180 | 10,755 |
| GLASS   | (SQ. FT) | 48    | 24    | 148   | 48    | 268    |
| PERSONNEL DOOR  | (SQ. FT) | 168   | 84    | 168   | 168   | 588    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0     | 0     | 0     | 0      |
| WALLS, NET  | (SQ. FT) | 2,852 | 3,220 | 1,864 | 1,964 | 9,899  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |       |       |       | 27,860 |
| OVERHEAD DOOR   | (SQ. FT) | 0     |       |       |       |        |
| PERSONNEL DOOR  | (SQ. FT) |       |       |       |       | 588    |
| BASEMENT WALLS  | (SQ. FT) |       |       |       |       | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS          | R-VALUE |
|---------------------------------------|--------------|---------------------|---------|
|                                       |              | 1. OUTSIDE AIR FILM | 0.17    |
|                                       |              | 2. 4" BRICK         | 1.20    |
|                                       |              | 3. AIR SPACE        | 1.00    |
|                                       |              | 4. 8" CONCRETE      | 1.11    |
|                                       |              | 5. 1/2" GWB         | 0.45    |
|                                       |              | 6.                  |         |
|                                       |              | 7. INSIDE AIR FILM  | 0.68    |
|                                       |              | TOTAL R-WALL =      |         |
| U=1/R                                 |              | 0.217               |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS          | R-VALUE |
|                                       |              | 1. OUTSIDE AIR FILM | 0.17    |
|                                       |              | 2. BUR              | 0.33    |
|                                       |              | 3. GRAVEL           | 0.33    |
|                                       |              | 4. URETHANE BD      | 16.29   |
|                                       |              | 5. 3/4" WOOD        | 0.83    |
|                                       |              | 6.                  |         |
|                                       |              | 7. INSIDE AIR FILM  | 0.68    |
|                                       |              | TOTAL R-ROOF =      |         |
| U=1/R                                 |              | 0.054               |         |
| GLASS TYPE:                           | DOUBLE PANE  | R-GLASS             | 1.75    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                 | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                          |              |       |     |     |
|-----------------------------------|-----------------------|--------|--------------------------|--------------|-------|-----|-----|
| WINDOWS (LF of Crack)             | 180 X 0.27 Sq.In./LF= | Sq.In. | 49                       | X CFM/Sq.In. | 1.530 | =   | 74  |
| PERSONNEL DOORS (SF)              | 588 X 0.16 Sq.In./SF= | Sq.In. | 94                       | X CFM/Sq.In. | 1.530 | =   | 144 |
|                                   |                       |        |                          |              |       |     |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM / OPENING /HR      | 1.600        | =     | 0   |     |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | X CFM / OPENING /HR      | 1.385        | =     | 0   |     |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |              | =     | 218 |     |

|              |   |             |        |                     |       |   |       |
|--------------|---|-------------|--------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 0      | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 588    | X DOOR "U"          | 0.552 | = | 325   |
| UA WALL      | = | WALL AREA   | 9,899  | X WALL "U"          | 0.217 | = | 2,147 |
| UA ROOF      | = | ROOF AREA   | 27,860 | X ROOF "U"          | 0.054 | = | 1,495 |
| UA GLASS     | = | GLASS AREA  | 268    | X GLASS "U"         | 0.571 | = | 153   |
| UA SLAB      | = | SLAB PERIM. | 827    | X SLF               | 0.680 | = | 563   |
| UA BASEM.    | = | B-WALL AREA | 0      | X BASE "U"          | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 218    | X A. T. F.          | 0.852 | = | 186   |
|              |   |             |        | TOTAL UA (BTU/HR°F) |       |   | 4,869 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |              |            |           |
|----------------------|--------------|------------|-----------|
| BLDG NO:             | 6910         | BLDG NAME: | CLASS SIX |
| BLDG FUNCTION:       | LIQUOR STORE |            |           |
| FLOOR AREA: (SQ. FT) | 2,226        | # FLOORS:  | 1         |
| SLAB PERIMETER: (FT) | 190          |            |           |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST | TOTAL |
|---|----------|-------|----------------|----------|------|-------|
| WALLS, GROSS  | (SQ. FT) | 689   | 689            | 546      | 546  | 2,470 |
| GLASS   | (SQ. FT) | 54    | 32             | 0        | 96   | 182   |
| PERSONNEL DOOR  | (SQ. FT) | 0     | 0              | 72       | 49   | 121   |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0    | 0     |
| WALLS, NET  | (SQ. FT) | 635   | 657            | 474      | 401  | 2,167 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |      | 2,226 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) |      | 121   |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |      | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|   |              |                     |         |
|---|--------------|---------------------|---------|
| II. CONSTRUCTION: ( [    ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES) |              |                     |         |
| WALLS: (SKETCH CROSS SECTION OF WALL)                                     |              | COMPONENTS          | R-VALUE |
|   | 1.           | OUTSIDE AIR FILM    | 0.17    |
|   | 2.           | FACE BRICK & PANELS | 1.19    |
|   | 3.           | AIR SPACE           | 1.00    |
|   | 4.           | URETHANE BRD INSUL  | 6.25    |
|   | 5.           | 8" CMU              | 1.11    |
|   | 6.           |                     |         |
|   | 7.           | INSIDE AIR FILM     | 0.68    |
|   |              | TOTAL R-WALL =      | 10.40   |
|   |              | U=1/R               | 0.096   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                      |              | COMPONENTS          | R-VALUE |
|   | 1.           | OUTSIDE AIR FILM    | 0.17    |
|   | 2.           | BUR                 | 0.33    |
|   | 3.           | URETHANE BRD INSUL  | 16.29   |
|   | 4.           | AIR SPACE           | 1.00    |
|   | 5.           | ACOUSTIC TILE CLG   | 1.25    |
|   | 6.           |                     |         |
|   | 7.           | INSIDE AIR FILM     | 0.68    |
|   |              | TOTAL R-ROOF =      | 19.72   |
|   |              | U=1/R               | 0.051   |
| GLASS TYPE:   | SINGLE PANE  | R-GLASS             | 0.90    |
| SLAB TYPE FLOOR:  | CONCRETE     | SLF                 | 0.68    |
| BASEMENT TYPE:  | NONE         | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE:   | NONE         | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE:  | HOLLOW METAL | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                          |                     |       |   |    |
|-----------------------------------|-----------------------|--------|--------------------------|---------------------|-------|---|----|
| iii. INFILTRATION:                |                       |        |                          |                     |       |   |    |
| WINDOWS (LF of Crack)             | 63 X 0.33 Sq.In./LF=  | Sq.In. | 21                       | X CFM/Sq.In.        | 1.530 | = | 32 |
| PERSONNEL DOORS (SF)              | 121 X 0.16 Sq.In./SF= | Sq.In. | 19                       | X CFM/Sq.In.        | 1.530 | = | 30 |
|                                   |                       |        |                          |                     |       |   |    |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM / OPENING /HR      |                     | 1.600 | = | 0  |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | 4                        | X CFM / OPENING /HR | 1.385 | = | 6  |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |                     |       | = | 67 |

|              |   |             |       |                     |       |   |     |
|--------------|---|-------------|-------|---------------------|-------|---|-----|
| UA ODOOR     | = | ODOOR AREA  | 0     | X DOOR "U"          | 0.000 | = | 0   |
| UA PDOOR     | = | PDOOR AREA  | 121   | X DOOR "U"          | 0.552 | = | 67  |
| UA WALL      | = | WALL AREA   | 2,167 | X WALL "U"          | 0.096 | = | 208 |
| UA ROOF      | = | ROOF AREA   | 2,226 | X ROOF "U"          | 0.051 | = | 113 |
| UA GLASS     | = | GLASS AREA  | 182   | X GLASS "U"         | 1.111 | = | 202 |
| UA SLAB      | = | SLAB PERIM. | 190   | X SLF               | 0.680 | = | 129 |
| UA BASEM.    | = | B-WALL AREA | 0     | X BASE. "U"         | 0.000 | = | 0   |
| INFILTRATION | = | CFM         | 67    | X A. T. F.          | 1.037 | = | 69  |
|              |   |             |       | TOTAL UA (BTU/HR*F) |       |   | 789 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 18-Jul-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                     |        |            |                          |
|---------------------|--------|------------|--------------------------|
| BLDG NO:            | 6918   | BLDG NAME: | SKILL DEVELOPMENT CENTER |
| BLDG FUNCTION:      |        |            |                          |
| FLOOR AREA (SQ. FT) | 18,312 | # FLOORS:  | 1                        |
| SLAB PERIMETER (FT) | 692    |            |                          |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST  | WEST     | TOTAL  |
|---|----------|-------|----------------|-------|----------|--------|
| WALLS, GROSS  | (SQ. FT) | 2,130 | 2,545          | 3,190 | 3,233    | 11,098 |
| GLASS   | (SQ. FT) | 0     | 131            | 144   | 116      | 391    |
| PERSONNEL DOOR  | (SQ. FT) | 56    | 21             | 42    | 84       | 203    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0     | 56       | 56     |
| WALLS, NET  | (SQ. FT) | 2,074 | 2,393          | 3,004 | 2,977    | 10,448 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |       |          | 18,312 |
| OVERHEAD DOOR   | (SQ. FT) | 56    | PERSONNEL DOOR |       | (SQ. FT) | 203    |
| BASEMENT WALLS  | (SQ. FT) |       |                |       |          | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS             | R-VALUE |
|---------------------------------------|--------------|------------------------|---------|
|                                       |              | 1. OUTSIDE AIR FILM    | 0.17    |
|                                       |              | 2. 4" FACE BRICK       | 1.20    |
|                                       |              | 3. 2" RIGID INSULATION | 5.56    |
|                                       |              | 4. AIR SPACE           | 1.00    |
|                                       |              | 5. 8" CONCRETE BLOCK   | 1.11    |
|                                       |              | 6. 1/2" GYPSUM BOARD   | 0.45    |
|                                       |              | 7. INSIDE AIR FILM     | 0.68    |
|                                       |              | TOTAL R-WALL =         |         |
| U=1/R                                 |              | 0.098                  |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS             | R-VALUE |
|                                       |              | 1. OUTSIDE AIR FILM    | 0.17    |
|                                       |              | 2. BUR                 | 0.33    |
|                                       |              | 3. 2" RIGID INSULATION | 5.56    |
|                                       |              | 4. 4" CONCRETE         | 0.33    |
|                                       |              | 5. 1/2" GYPSUM BOARD   | 0.45    |
|                                       |              | 6.                     |         |
|                                       |              | 7. INSIDE AIR FILM     | 0.68    |
|                                       |              | TOTAL R-ROOF =         |         |
| U=1/R                                 |              | 0.133                  |         |
| GLASS TYPE:                           | DOUBLE PANE  | R-GLASS                | 1.75    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                    | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.               | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR                | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR                | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                          |              |       |   |    |
|-----------------------------------|-----------------------|--------|--------------------------|--------------|-------|---|----|
| WINDOWS (LF of Crack)             | 0 X 0.27 Sq.In./LF=   | Sq.In. | 0                        | X CFM/Sq.In. | 1.530 | = | 0  |
| PERSONNEL DOORS (SF)              | 203 X 0.16 Sq.In./SF= | Sq.In. | 32                       | X CFM/Sq.In. | 1.530 | = | 50 |
|                                   |                       |        |                          |              |       |   |    |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM /OPENING /HR       |              | 1.600 | = | 0  |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | X CFM /OPENING /HR       |              | 1.385 | = | 0  |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |              |       | = | 50 |

|              |   |             |                     |             |       |   |       |
|--------------|---|-------------|---------------------|-------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 56                  | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 203                 | X DOOR "U"  | 0.552 | = | 112   |
| UA WALL      | = | WALL AREA   | 10,448              | X WALL "U"  | 0.098 | = | 1,027 |
| UA ROOF      | = | ROOF AREA   | 18,312              | X ROOF "U"  | 0.133 | = | 2,435 |
| UA GLASS     | = | GLASS AREA  | 391                 | X GLASS "U" | 0.571 | = | 223   |
| UA SLAB      | = | SLAB PERIM. | 692                 | X SLF       | 0.680 | = | 470   |
| UA BASEM.    | = | B-WALL AREA | 0                   | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 50                  | X A. T. F.  | 0.852 | = | 42    |
|              |   |             | TOTAL UA (BTU/HR°F) |             |       |   | 4,311 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |            |
|----------------------|-------|------------|------------|
| BLDG NO:             | 7017  | BLDG NAME: | BN HQ BLDG |
| BLDG FUNCTION:       |       |            |            |
| FLOOR AREA: (SQ. FT) | 2,578 | # FLOORS:  | 1          |
| SLAB PERIMETER: (FT) | 211   |            |            |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST | TOTAL |
|---|----------|-------|----------------|----------|------|-------|
| WALLS, GROSS  | (SQ. FT) | 363   | 363            | 625      | 625  | 1,975 |
| GLASS   | (SQ. FT) | 35    | 35             | 123      | 158  | 350   |
| PERSONNEL DOOR  | (SQ. FT) | 0     | 21             | 42       | 0    | 63    |
| OVERHEAD DOOR   | (SQ. FT) |       |                |          |      | 0     |
| WALLS, NET  | (SQ. FT) | 328   | 307            | 461      | 468  | 1,562 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |      | 2,578 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) |      | 63    |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |      | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) | COMPONENTS               | R-VALUE |
|---------------------------------------|--------------------------|---------|
|                                       | 1. OUTSIDE AIR FILM      | 0.17    |
|                                       | 2. 4" BRICK              | 1.20    |
|                                       | 3. AIR SPACE             | 1.00    |
|                                       | 4. 8" CMU                | 1.11    |
|                                       | 5.                       |         |
|                                       | 6.                       |         |
|                                       | 7. INSIDE AIR FILM       | 0.68    |
|                                       | TOTAL R-WALL =           | 4.16    |
|                                       | U=1/R                    | 0.240   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  | COMPONENTS               | R-VALUE |
|                                       | 1. OUTSIDE AIR FILM      | 0.17    |
|                                       | 2. BUR                   | 0.33    |
|                                       | 3. 2" RIGID INSUL        | 5.56    |
|                                       | 4. AIR SPACE             | 1.00    |
|                                       | 5. ACOUSTIC TILE CEILING | 1.25    |
|                                       | 6.                       |         |
|                                       | 7. INSIDE AIR FILM       | 0.68    |
|                                       | TOTAL R-ROOF =           | 8.99    |
|                                       | U=1/R                    | 0.111   |
| GLASS TYPE: DOUBLE PANE               | R-GLASS                  | 1.75    |
| SLAB TYPE FLOOR: CONCRETE             | SLF                      | 0.68    |
| BASEMENT TYPE: NONE                   | R-BASEM.                 | 0.00    |
| OVERHEAD DOOR TYPE: NONE              | R-ODOOR                  | 0.00    |
| PERSONNEL DOOR TYPE: HOLLOW METAL     | R-PDOOR                  | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |    |                          |       |   |     |
|-----------------------------------|-----------------------|--------|----|--------------------------|-------|---|-----|
| III. INFILTRATION:                |                       |        |    |                          |       |   |     |
| WINDOWS (LF of Crack)             | 240 X 0.27 Sq.In./LF= | Sq.In. | 65 | X CFM/Sq.In.             | 1.530 | = | 99  |
| PERSONNEL DOORS (SF)              | 63 X 0.16 Sq.In./SF=  | Sq.In. | 10 | X CFM/Sq.In.             | 1.530 | = | 15  |
|                                   |                       |        |    |                          |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | 2  | X CFM /OPENING /HR       | 1.600 | = | 3   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        |    | X CFM /OPENING /HR       | 1.385 | = | 0   |
|                                   |                       |        |    | TOTAL INFILTRATION (CFM) |       | = | 118 |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 63    | X DOOR "U"  | 0.552 | = | 35    |
| UA WALL             | = | WALL AREA   | 1,562 | X WALL "U"  | 0.240 | = | 376   |
| UA ROOF             | = | ROOF AREA   | 2,578 | X ROOF "U"  | 0.111 | = | 287   |
| UA GLASS            | = | GLASS AREA  | 350   | X GLASS "U" | 0.571 | = | 200   |
| UA SLAB             | = | SLAB PERIM. | 211   | X SLF       | 0.680 | = | 143   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 118   | X A. T. F.  | 1.037 | = | 122   |
| TOTAL UA (BTU/HR°F) |   |             |       |             |       |   | 1,162 |



E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |               |
|----------------------|-------|------------|---------------|
| BLDG NO:             | 7028  | BLDG NAME: | BN CLASSROOMS |
| BLDG FUNCTION:       |       |            |               |
| FLOOR AREA: (SQ. FT) | 3,943 | # FLOORS:  | 1             |
| SLAB PERIMETER: (FT) | 262   |            |               |

#### I. AREAS: ( ☐ FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST | TOTAL |
|---|----------|-------|----------------|----------|------|-------|
| WALLS, GROSS  | (SQ. FT) | 986   | 986            | 836      | 836  | 3,644 |
| GLASS   | (SQ. FT) | 100   | 124            | 205      | 205  | 634   |
| PERSONNEL DOOR  | (SQ. FT) | 42    | 42             | 42       | 42   | 168   |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0    | 0     |
| WALLS, NET  | (SQ. FT) | 844   | 820            | 589      | 589  | 2,842 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |      | 3,943 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) |      | 168   |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |      | 0     |

#### II. CONSTRUCTION: ( ☐ FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS            | R-VALUE |
|---------------------------------------|--------------|-----------------------|---------|
|                                       |              | 1. OUTSIDE AIR FILM   | 0.17    |
|                                       |              | 2. 4" FACE BRICK      | 1.20    |
|                                       |              | 3. 2" AIR SPACE       | 1.00    |
|                                       |              | 4. 8" CMU             | 1.11    |
|                                       |              | 5.                    |         |
|                                       |              | 6.                    |         |
|                                       |              | 7. INSIDE AIR FILM    | 0.68    |
|                                       |              | TOTAL R-WALL =        | 4.16    |
|                                       |              | U=1/R                 | 0.240   |
|                                       |              |                       |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS            | R-VALUE |
|                                       |              | 1. OUTSIDE AIR FILM   | 0.17    |
|                                       |              | 2. 2" POURED CONCRETE | 0.52    |
|                                       |              | 3. BUR                | 0.33    |
|                                       |              | 4. 1" RIGID INSUL.    | 2.78    |
|                                       |              | 5. 1" AIR SPACE       | 1.00    |
|                                       |              | 6. 2" GYPSUM BD.      | 0.45    |
|                                       |              | 7. INSIDE AIR FILM    | 0.68    |
|                                       |              | TOTAL R-ROOF =        | 5.93    |
|                                       |              | U=1/R                 | 0.169   |
|                                       |              |                       |         |
| GLASS TYPE:                           | SINGLE PANE  | R-GLASS               | 0.00    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                   | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.              | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR               | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR               | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                     |                     |       |                          |       |
|-----------------------------------|-----------------------|--------|---------------------|---------------------|-------|--------------------------|-------|
| WINDOWS (LF of Crack)             | 112 X 0.33 Sq.In./LF= | Sq.In. | 37                  | X CFM/Sq.In.        | 1.530 | =                        | 57    |
| PERSONNEL DOORS (SF)              | 168 X 0.16 Sq.In./SF= | Sq.In. | 27                  | X CFM/Sq.In.        | 1.530 | =                        | 41    |
|                                   |                       |        |                     |                     |       |                          |       |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM / OPENING /HR |                     | 1.600 | =                        | 0     |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | 2                   | X CFM / OPENING /HR | 1.385 | =                        | 3     |
|                                   |                       |        |                     |                     |       | TOTAL INFILTRATION (CFM) | = 100 |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 168   | X DOOR "U"  | 0.552 | = | 93    |
| UA WALL             | = | WALL AREA   | 2,842 | X WALL "U"  | 0.240 | = | 683   |
| UA ROOF             | = | ROOF AREA   | 3,943 | X ROOF "U"  | 0.169 | = | 665   |
| UA GLASS            | = | GLASS AREA  | 634   | X GLASS "U" | 0.000 | = | 0     |
| UA SLAB             | = | SLAB PERIM. | 262   | X SLF       | 0.680 | = | 178   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 100   | X A. T. F.  | 1.037 | = | 104   |
| TOTAL UA (BTU/HR*F) |   |             |       |             |       |   | 1,723 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |            |
|----------------------|-------|------------|------------|
| BLDG NO:             | 7031  | BLDG NAME: | BN HQ BLDG |
| BLDG FUNCTION:       |       |            |            |
| FLOOR AREA: (SQ. FT) | 3,943 | # FLOORS:  | 1          |
| SLAB PERIMETER: (FT) | 262   |            |            |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST | TOTAL |
|---|----------|-------|----------------|----------|------|-------|
| WALLS, GROSS  | (SQ. FT) | 986   | 986            | 836      | 836  | 3,644 |
| GLASS   | (SQ. FT) | 100   | 124            | 205      | 205  | 634   |
| PERSONNEL DOOR  | (SQ. FT) | 42    | 42             | 42       | 42   | 168   |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0    | 0     |
| WALLS, NET  | (SQ. FT) | 844   | 820            | 589      | 589  | 2,842 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |      | 3,943 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) |      | 168   |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |      | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| II. CONSTRUCTION: ( [ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES ) |              |                    |         |
|---|--------------|--------------------|---------|
| WALLS: (SKETCH CROSS SECTION OF WALL)                                   |              | COMPONENTS         | R-VALUE |
|   | 1.           | OUTSIDE AIR FILM   | 0.17    |
|   | 2.           | 4" FACE BRICK      | 1.20    |
|   | 3.           | 2" AIR SPACE       | 1.00    |
|   | 4.           | 8" CMU             | 1.11    |
|   | 5.           |                    |         |
|   | 6.           |                    |         |
|   | 7.           | INSIDE AIR FILM    | 0.68    |
|   |              | TOTAL R-WALL =     | 4.16    |
|   |              | U=1/R              | 0.240   |
|   |              |                    |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                    |              | COMPONENTS         | R-VALUE |
|   | 1.           | OUTSIDE AIR FILM   | 0.17    |
|   | 2.           | 2" POURED CONCRETE | 0.52    |
|   | 3.           | BUR                | 0.33    |
|   | 4.           | 1" RIGID INSUL.    | 2.78    |
|   | 5.           | 1" AIR SPACE       | 1.00    |
|   | 6.           | 2" GYPSUM BD.      | 0.45    |
|   | 7.           | INSIDE AIR FILM    | 0.68    |
|   |              | TOTAL R-ROOF =     | 5.93    |
|   |              | U=1/R              | 0.169   |
|   |              |                    |         |
| GLASS TYPE:   | SINGLE PANE  | R-GLASS            | 0.00    |
| SLAB TYPE FLOOR:  | CONCRETE     | SLF                | 0.68    |
| BASEMENT TYPE:  | NONE         | R-BASEM.           | 0.00    |
| OVERHEAD DOOR TYPE:   | NONE         | R-ODOOR            | 0.00    |
| PERSONNEL DOOR TYPE:  | HOLLOW METAL | R-PDOOR            | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                     |                          |       |       |     |   |
|-----------------------------------|-----------------------|--------|---------------------|--------------------------|-------|-------|-----|---|
| III. INFILTRATION:                |                       |        |                     |                          |       |       |     |   |
| WINDOWS (LF of Crack)             | 112 X 0.33 Sq.In./LF= | Sq.In. | 37                  | X CFM/Sq.In.             | 1.530 | =     | 57  |   |
| PERSONNEL DOORS (SF)              | 168 X 0.16 Sq.In./SF= | Sq.In. | 27                  | X CFM/Sq.In.             | 1.530 | =     | 41  |   |
|                                   |                       |        |                     |                          |       |       |     |   |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM / OPENING /HR |                          | 1.600 | =     | 0   |   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | 2                   | X CFM / OPENING /HR      |       | 1.385 | =   | 3 |
|                                   |                       |        |                     | TOTAL INFILTRATION (CFM) |       | =     | 100 |   |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 168   | X DOOR "U"  | 0.552 | = | 93    |
| UA WALL             | = | WALL AREA   | 2,842 | X WALL "U"  | 0.240 | = | 683   |
| UA ROOF             | = | ROOF AREA   | 3,943 | X ROOF "U"  | 0.169 | = | 665   |
| UA GLASS            | = | GLASS AREA  | 634   | X GLASS "U" | 0.000 | = | 0     |
| UA SLAB             | = | SLAB PERIM. | 262   | X SLF       | 0.680 | = | 178   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 100   | X A. T. F.  | 1.037 | = | 104   |
| TOTAL UA (BTU/HR*F) |   |             |       |             |       |   | 1,723 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 18-Jul-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |            |
|----------------------|-------|------------|------------|
| BLDG NO:             | 7033  | BLDG NAME: | BN HQ BLDG |
| BLDG FUNCTION:       |       |            |            |
| FLOOR AREA: (SQ. FT) | 3,870 | # FLOORS:  | 1          |
| SLAB PERIMETER: (FT) | 284   |            |            |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | SOUTH-W        | NORTH-E | SOUTH-E  | TOTAL |
|---|----------|---------|----------------|---------|----------|-------|
| WALLS, GROSS  | (SQ. FT) | 976     | 728            | 728     | 976      | 3,408 |
| GLASS   | (SQ. FT) | 48      | 0              | 60      | 156      | 264   |
| PERSONNEL DOOR  | (SQ. FT) | 105     | 105            | 0       | 42       | 252   |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0       | 0        | 0     |
| WALLS, NET  | (SQ. FT) | 823     | 623            | 668     | 778      | 2,892 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) |          |         |                |         | (SQ. FT) | 3,870 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR |         | (SQ. FT) | 252   |
| BASEMENT WALLS  | (SQ. FT) |         |                |         |          |       |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS             | R-VALUE |
|---------------------------------------|--------------|------------------------|---------|
|                                       |              | 1. OUTSIDE AIR FILM    | 0.17    |
|                                       |              | 2. 4" FACE BRICK       | 1.20    |
|                                       |              | 3. 2" AIR SPACE        | 1.00    |
|                                       |              | 4. 8" CMU              | 1.11    |
|                                       |              | 5.                     |         |
|                                       |              | 6.                     |         |
|                                       |              | 7. INSIDE AIR FILM     | 0.68    |
|                                       |              | TOTAL R-WALL =         | 4.16    |
|                                       |              | U=1/R                  | 0.240   |
|                                       |              |                        |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS             | R-VALUE |
|                                       |              | 1. OUTSIDE AIR FILM    | 0.17    |
|                                       |              | 2. BUR                 | 0.33    |
|                                       |              | 3. 2" RIGID INSUL.     | 5.56    |
|                                       |              | 4. AIR SPACE           | 1.00    |
|                                       |              | 5. GYP PLASTER CEILING | 0.39    |
|                                       |              | 6.                     |         |
|                                       |              | 7. INSIDE AIR FILM     | 0.68    |
|                                       |              | TOTAL R-ROOF =         | 8.13    |
|                                       |              | U=1/R                  | 0.123   |
|                                       |              |                        |         |
| GLASS TYPE:                           | SINGLE PANE  | R-GLASS                | 0.90    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                    | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.               | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR                | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR                | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |    |                          |       |   |     |
|-----------------------------------|-----------------------|--------|----|--------------------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 182 X 0.33 Sq.In./LF= | Sq.In. | 60 | X CFM/Sq.In.             | 1.530 | = | 92  |
| PERSONNEL DOORS (SF)              | 252 X 0.16 Sq.In./SF= | Sq.In. | 40 | X CFM/Sq.In.             | 1.530 | = | 62  |
|                                   |                       |        |    |                          |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        |    | X CFM / OPENING /HR      | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS | 3                     |        |    | X CFM / OPENING /HR      | 1.385 | = | 4   |
|                                   |                       |        |    | TOTAL INFILTRATION (CFM) |       | = | 158 |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 252   | X DOOR "U"  | 0.552 | = | 139   |
| UA WALL             | = | WALL AREA   | 2,892 | X WALL "U"  | 0.240 | = | 695   |
| UA ROOF             | = | ROOF AREA   | 3,870 | X ROOF "U"  | 0.123 | = | 476   |
| UA GLASS            | = | GLASS AREA  | 264   | X GLASS "U" | 1.111 | = | 293   |
| UA SLAB             | = | SLAB PERIM. | 284   | X SLF       | 0.680 | = | 193   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 158   | X A. T. F.  | 1.037 | = | 164   |
| TOTAL UA (BTU/HR°F) |   |             |       |             |       |   | 1,960 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |                    |
|----------------------|-------|------------|--------------------|
| BLDG NO:             | 7036  | BLDG NAME: | REGIMENTAL HQ BLDG |
| BLDG FUNCTION:       |       |            |                    |
| FLOOR AREA: (SQ. FT) | 9,390 | # FLOORS:  | 3                  |
| SLAB PERIMETER: (FT) |       |            |                    |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST  | TOTAL |
|---|----------|-------|----------------|----------|-------|-------|
| WALLS, GROSS  | (SQ. FT) | 760   | 760            | 1,587    | 1,587 | 4,693 |
| GLASS   | (SQ. FT) | 192   | 153            | 595      | 652   | 1,592 |
| PERSONNEL DOOR  | (SQ. FT) | 64    | 21             | 42       | 21    | 148   |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0     | 0     |
| WALLS, NET  | (SQ. FT) | 504   | 586            | 950      | 914   | 2,953 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |       | 3,015 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) |       | 148   |
| BASEMENT WALLS  | (SQ. FT) | 552   | 447            | 1,014    | 1,014 | 3,027 |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|   |  |                                      |         |
|---|--|--------------------------------------|---------|
| II. CONSTRUCTION: ( [     ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES ) |  |                                      |         |
| WALLS: (SKETCH CROSS SECTION OF WALL)                                       |  | COMPONENTS                           | R-VALUE |
|   |  | 1. OUTSIDE AIR FILM                  | 0.17    |
|   |  | 2. 4" FACE BRICK                     | 1.20    |
|   |  | 3. 2" AIR SPACE                      | 1.00    |
|   |  | 4. 8" CMU                            | 1.11    |
|   |  | 5.                                   |         |
|   |  | 6.                                   |         |
|   |  | 7. INSIDE AIR FILM                   | 0.68    |
|   |  | TOTAL R-WALL =                       | 4.16    |
|   |  | U=1/R                                | 0.240   |
|   |  | ROOF: (SKETCH CROSS SECTION OF ROOF) |         |
|   |  | 1. OUTSIDE AIR FILM                  | 0.17    |
|   |  | 2. 5 PLY BUR                         | 0.33    |
|   |  | 3. 2" RIGID INSUL                    | 5.56    |
|   |  | 4. 2" POURED FILL                    | 0.52    |
|   |  | 5.                                   |         |
|   |  | 6.                                   |         |
|   |  | 7. INSIDE AIR FILM                   | 0.68    |
|   |  | TOTAL R-ROOF =                       | 7.26    |
|   |  | U=1/R                                | 0.138   |
|   |  | GLASS TYPE: SINGLE PANE W/STORMS     |         |
| SLAB TYPE FLOOR: CONCRETE   |  | SLF                                  | 0.68    |
| BASEMENT TYPE: NONE   |  | R-BASEM.                             | 0.00    |
| OVERHEAD DOOR TYPE: NONE  |  | R-ODOOR                              | 0.00    |
| PERSONNEL DOOR TYPE: HOLLOW METAL   |  | R-PDOOR                              | 1.81    |

#### III. INFILTRATION:

|                                   |                       |                      |       |              |       |   |     |
|-----------------------------------|-----------------------|----------------------|-------|--------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 664 X 0.33 Sq.In./LF= | Sq.In.               | 219   | X CFM/Sq.In. | 1.530 | = | 335 |
| PERSONNEL DOORS (SF)              | 148 X 0.16 Sq.In./SF= | Sq.In.               | 24    | X CFM/Sq.In. | 1.530 | = | 36  |
|                                   |                       |                      |       |              |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  | 4                     | X CFM / OPENING / HR | 1.600 | =            |       |   | 6   |
| DOOR OPENINGS / HR - DOUBLE DOORS | 8                     | X CFM / OPENING / HR | 1.385 | =            |       |   | 11  |
| TOTAL INFILTRATION (CFM)          |                       |                      |       |              |       | = | 389 |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 148   | X DOOR "U"  | 0.552 | = | 82    |
| UA WALL             | = | WALL AREA   | 2,953 | X WALL "U"  | 0.240 | = | 710   |
| UA ROOF             | = | ROOF AREA   | 3,015 | X ROOF "U"  | 0.138 | = | 415   |
| UA GLASS            | = | GLASS AREA  | 1,592 | X GLASS "U" | 0.625 | = | 995   |
| UA SLAB             | = | SLAB PERIM. | 0     | X SLF       | 0.680 | = | 0     |
| UA BASEM.           | = | B-WALL AREA | 3,027 | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 389   | X A. T. F.  | 1.037 | = | 403   |
| TOTAL UA (BTU/HR°F) |   |             |       |             |       | = | 2,605 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                   |
|----------------------|--------|------------|-------------------|
| BLDG NO:             | 7050   | BLDG NAME: | ENL BARRACKS W/AS |
| BLDG FUNCTION:       |        |            |                   |
| FLOOR AREA: (SQ. FT) | 33,888 | # FLOORS:  | 3                 |
| SLAB PERIMETER: (FT) |        |            |                   |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL  |
|---|----------|---------|----------------|----------|---------|--------|
| WALLS, GROSS  | (SQ. FT) | 1,528   | 8,847          | 8,847    | 1,200   | 20,422 |
| GLASS   | (SQ. FT) | 165     | 2,670          | 2,565    | 315     | 5,715  |
| PERSONNEL DOOR  | (SQ. FT) |         |                |          |         | 0      |
| OVERHEAD DOOR   | (SQ. FT) |         |                |          |         | 0      |
| WALLS, NET  | (SQ. FT) | 1,363   | 6,177          | 6,282    | 885     | 14,707 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 10,146 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) |         | 0      |
| BASEMENT WALLS  | (SQ. FT) | 304     | 2,592          | 2,416    | 960     | 6,272  |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS          | R-VALUE |
|---------------------------------------|--------------|---------------------|---------|
|                                       |              | 1. OUTSIDE AIR FILM | 0.17    |
|                                       |              | 2. 4" CMU           | 0.72    |
|                                       |              | 3. AIR SPACE        | 1.00    |
|                                       |              | 4. 8" CMU           | 1.11    |
|                                       |              | 5.                  |         |
|                                       |              | 6.                  |         |
|                                       |              | 7. INSIDE AIR FILM  | 0.68    |
|                                       |              | TOTAL R-WALL =      | 3.68    |
|                                       |              | U=1/R               | 0.272   |
|                                       |              |                     |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS          | R-VALUE |
|                                       |              | 1. OUTSIDE AIR FILM | 0.17    |
|                                       |              | 2. BUR              | 0.33    |
|                                       |              | 3. 2" RIGID INSUL   | 5.56    |
|                                       |              | 4. 4" CONCRETE      | 0.33    |
|                                       |              | 5.                  |         |
|                                       |              | 6.                  |         |
|                                       |              | 7. INSIDE AIR FILM  | 0.68    |
|                                       |              | TOTAL R-ROOF =      | 7.07    |
|                                       |              | U=1/R               | 0.141   |
|                                       |              |                     |         |
| GLASS TYPE:                           | SINGLE PANE  | R-GLASS             | 0.00    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                 | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                        |                    |       |              |       |   |      |
|-----------------------------------|------------------------|--------------------|-------|--------------|-------|---|------|
| WINDOWS (LF of Crack)             | 3048 X 0.33 Sq.In./LF= | Sq.In.             | 1006  | X CFM/Sq.In. | 1.530 | = | 1539 |
| PERSONNEL DOORS (SF)              | 0 X 0.16 Sq.In./SF=    | Sq.In.             | 0     | X CFM/Sq.In. | 1.530 | = | 0    |
| DOOR OPENINGS / HR - SINGLE DOOR  |                        | X CFM /OPENING /HR | 1.600 | =            |       |   | 0    |
| DOOR OPENINGS / HR - DOUBLE DOORS |                        | X CFM /OPENING /HR | 1.385 | =            |       |   | 0    |
| TOTAL INFILTRATION (CFM)          |                        |                    |       |              |       | = | 1539 |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 0      | X DOOR "U"  | 0.552 | = | 0     |
| UA WALL             | = | WALL AREA   | 14,707 | X WALL "U"  | 0.272 | = | 3,996 |
| UA ROOF             | = | ROOF AREA   | 10,146 | X ROOF "U"  | 0.141 | = | 1,435 |
| UA GLASS            | = | GLASS AREA  | 5,715  | X GLASS "U" | 0.000 | = | 0     |
| UA SLAB             | = | SLAB PERIM. | 0      | X SLF       | 0.680 | = | 0     |
| UA BASEM.           | = | B-WALL AREA | 6,272  | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 1539   | X A. T. F.  | 1.037 | = | 1,596 |
| TOTAL UA (BTU/HR°F) |   |             |        |             |       |   | 7,027 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 18-Jul-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                 |
|----------------------|--------|------------|-----------------|
| BLDG NO:             | 7109   | BLDG NAME: | BN ADMIN & CLRM |
| BLDG FUNCTION:       |        |            |                 |
| FLOOR AREA: (SQ. FT) | 14,271 | # FLOORS:  | 1               |
| SLAB PERIMETER: (FT) | 532    |            |                 |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL  |
|---|----------|---------|----------------|----------|---------|--------|
| WALLS, GROSS  | (SQ. FT) | 2,300   | 482            | 482      | 2,300   | 5,564  |
| GLASS   | (SQ. FT) | 56      | 0              | 0        | 248     | 304    |
| PERSONNEL DOOR  | (SQ. FT) | 168     | 42             | 0        | 42      | 252    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0      |
| WALLS, NET  | (SQ. FT) | 2,076   | 440            | 482      | 2,010   | 5,008  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 17,664 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) | 252     |        |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|   |              |                     |         |
|---|--------------|---------------------|---------|
| II. CONSTRUCTION: (1 FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES) |              |                     |         |
| WALLS: (SKETCH CROSS SECTION OF WALL)                               |              | COMPONENTS          | R-VALUE |
|   | 1.           | OUTSIDE AIR FILM    | 0.17    |
|   | 2.           | 6" FACE BRICK       | 1.80    |
|   | 3.           | 2" RIGID INSULATION | 5.56    |
|   | 4.           | 6" CMU              | 0.92    |
|   | 5.           |                     |         |
|   | 6.           |                     |         |
|   | 7.           | INSIDE AIR FILM     | 0.68    |
|   |              | TOTAL R-WALL =      | 9.13    |
|   |              | U=1/R               | 0.110   |
|   |              |                     |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                |              | COMPONENTS          | R-VALUE |
|   | 1.           | OUTSIDE AIR FILM    | 0.17    |
|   | 2.           | METAL DECK          | 0.00    |
|   | 3.           | 2" RIGID INSUL      | 5.56    |
|   | 4.           | 1/2" GYPSUM BOARD   | 0.45    |
|   | 5.           |                     |         |
|   | 6.           |                     |         |
|   | 7.           | INSIDE AIR FILM     | 0.68    |
|   |              | TOTAL R-ROOF =      | 6.86    |
|   |              | U=1/R               | 0.146   |
|   |              |                     |         |
| GLASS TYPE:   | SINGLE PANE  | R-GLASS             | 0.90    |
| SLAB TYPE FLOOR:  | CONCRETE     | SLF                 | 0.68    |
| BASEMENT TYPE:  | NONE         | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE:   | NONE         | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE:  | HOLLOW METAL | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                          |              |       |   |     |
|-----------------------------------|-----------------------|--------|--------------------------|--------------|-------|---|-----|
| TOTAL INFILTRATION:               |                       |        |                          |              |       |   |     |
| WINDOWS (LF of Crack)             | 228 X 0.33 Sq.In./LF= | Sq.In. | 75                       | X CFM/Sq.In. | 1.530 | = | 115 |
| PERSONNEL DOORS (SF)              | 252 X 0.16 Sq.In./SF= | Sq.In. | 40                       | X CFM/Sq.In. | 1.530 | = | 62  |
|                                   |                       |        |                          |              |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM / OPENING /HR      |              | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | X CFM / OPENING /HR      |              | 1.385 | = | 0   |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |              |       | = | 177 |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 252    | X DOOR "U"  | 0.552 | = | 139   |
| UA WALL             | = | WALL AREA   | 5,008  | X WALL "U"  | 0.110 | = | 548   |
| UA ROOF             | = | ROOF AREA   | 17,664 | X ROOF "U"  | 0.146 | = | 2,575 |
| UA GLASS            | = | GLASS AREA  | 304    | X GLASS "U" | 1.111 | = | 338   |
| UA SLAB             | = | SLAB PERIM. | 532    | X SLF       | 0.680 | = | 362   |
| UA BASEM.           | = | B-WALL AREA | 0      | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 177    | X A. T. F.  | 0.852 | = | 151   |
| TOTAL UA (BTU/HR°F) |   |             |        |             |       |   | 4,113 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |            |
|----------------------|--------|------------|------------|
| BLDG NO:             | 7212   | BLDG NAME: | CO HQ BLDG |
| BLDG FUNCTION:       |        |            |            |
| FLOOR AREA: (SQ. FT) | 21,424 | # FLOORS:  | 1          |
| SLAB PERIMETER: (FT) | 620    |            |            |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST  | WEST     | TOTAL  |
|---|----------|-------|----------------|-------|----------|--------|
| WALLS, GROSS  | (SQ. FT) | 2,132 | 2,132          | 2,884 | 2,884    | 10,032 |
| GLASS   | (SQ. FT) | 0     | 0              | 0     | 328      | 328    |
| PERSONNEL DOOR  | (SQ. FT) | 0     | 0              | 378   | 84       | 462    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0     | 0        | 0      |
| WALLS, NET  | (SQ. FT) | 2,132 | 2,132          | 2,506 | 2,472    | 9,242  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |       |          | 22,248 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR |       | (SQ. FT) | 462    |
| BASEMENT WALLS  | (SQ. FT) |       |                |       |          | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |  | COMPONENTS                | R-VALUE |
|---------------------------------------|--|---------------------------|---------|
|                                       |  | 1. OUTSIDE AIR FILM       | 0.17    |
|                                       |  | 2. 6" JUMBO BRICK         | 1.80    |
|                                       |  | 3. 2" INSULATION          | 8.00    |
|                                       |  | 4. 6" CMU                 | 1.29    |
|                                       |  | 5.                        |         |
|                                       |  | 6.                        |         |
|                                       |  | 7. INSIDE AIR FILM        | 0.68    |
|                                       |  | TOTAL R-WALL =            | 11.94   |
|                                       |  | U=1/R                     | 0.084   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |  | COMPONENTS                | R-VALUE |
|                                       |  | 1. OUTSIDE AIR FILM       | 0.17    |
|                                       |  | 2. SHINGLES               | 0.44    |
|                                       |  | 3. FELT UNDERLAYMENT      | 0.06    |
|                                       |  | 4. 1/2" PLYWOOD SHEATHING | 0.62    |
|                                       |  | 5. AIR SPACE              | 1.00    |
|                                       |  | 6. ACU CEILING            | 1.25    |
|                                       |  | 7. INSIDE AIR FILM        | 0.68    |
|                                       |  | TOTAL R-ROOF =            | 4.22    |
|                                       |  | U=1/R                     | 0.237   |
| GLASS TYPE: SINGLE PANE               |  | R-GLASS                   | 0.90    |
| SLAB TYPE FLOOR: CONCRETE             |  | SLF                       | 0.68    |
| BASEMENT TYPE: NONE                   |  | R-BASEM.                  | 0.00    |
| OVERHEAD DOOR TYPE: NONE              |  | R-ODOOR                   | 0.00    |
| PERSONNEL DOOR TYPE: HOLLOW METAL     |  | R-PDOOR                   | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                          |              |       |     |     |
|-----------------------------------|-----------------------|--------|--------------------------|--------------|-------|-----|-----|
| WINDOWS (LF of Crack)             | 160 X 0.33 Sq.In./LF= | Sq.In. | 53                       | X CFM/Sq.In. | 1.530 | =   | 81  |
| PERSONNEL DOORS (SF)              | 462 X 0.16 Sq.In./SF= | Sq.In. | 74                       | X CFM/Sq.In. | 1.530 | =   | 113 |
|                                   |                       |        |                          |              |       |     |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM / OPENING /HR      | 1.600        | =     | 0   |     |
| DOOR OPENINGS / HR - DOUBLE DOORS | 12                    |        | X CFM / OPENING /HR      | 1.385        | =     | 17  |     |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |              | =     | 211 |     |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 462    | X DOOR "U"  | 0.552 | = | 255   |
| UA WALL             | = | WALL AREA   | 9,242  | X WALL "U"  | 0.084 | = | 774   |
| UA ROOF             | = | ROOF AREA   | 22,248 | X ROOF "U"  | 0.237 | = | 5,272 |
| UA GLASS            | = | GLASS AREA  | 328    | X GLASS "U" | 1.111 | = | 364   |
| UA SLAB             | = | SLAB PERIM. | 620    | X SLF       | 0.680 | = | 422   |
| UA BASEM.           | = | B-WALL AREA | 0      | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 211    | X A. T. F.  | 1.037 | = | 218   |
| TOTAL UA (BTU/HR°F) |   |             |        |             |       |   | 7,306 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |            |
|----------------------|--------|------------|------------|
| BLDG NO:             | 7220   | BLDG NAME: | CO HQ BLDG |
| BLDG FUNCTION:       |        |            |            |
| FLOOR AREA: (SQ. FT) | 18,624 | # FLOORS:  | 1          |
| SLAB PERIMETER: (FT) | 578    |            |            |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST  | WEST     | TOTAL  |
|---|----------|-------|----------------|-------|----------|--------|
| WALLS, GROSS  | (SQ. FT) | 1,989 | 1,989          | 2,688 | 2,688    | 9,353  |
| GLASS   | (SQ. FT) | 0     | 0              | 0     | 328      | 328    |
| PERSONNEL DOOR  | (SQ. FT) | 0     | 0              | 378   | 84       | 462    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0     | 0        | 0      |
| WALLS, NET  | (SQ. FT) | 1,989 | 1,989          | 2,310 | 2,276    | 8,563  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |       |          | 20,736 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR |       | (SQ. FT) | 462    |
| BASEMENT WALLS  | (SQ. FT) |       |                |       |          | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|  |              |                |                   |         |
|--|--------------|----------------|-------------------|---------|
| II. CONSTRUCTION: ( [ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPE ) |              | COMPONENTS     |                   | R-VALUE |
| <div>WALLS: (SKETCH CROSS SECTION OF WALL)</div>                       |              | 1.             | OUTSIDE AIR FILM  | 0.17    |
|  |              | 2.             | 6" JUMBO BRICK    | 1.80    |
|  |              | 3.             | 2" INSULATION     | 8.00    |
|  |              | 4.             | 6" CMU            | 1.29    |
|  |              | 5.             |                   |         |
|  |              | 6.             |                   |         |
|  |              | 7.             | INSIDE AIR FILM   | 0.68    |
|  |              | TOTAL R-WALL = |                   | 11.94   |
|  |              | U=1/R          |                   | 0.084   |
|  |              |                |                   |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                   |              | COMPONENTS     |                   | R-VALUE |
| <div></div>  |              | 1.             | OUTSIDE AIR FILM  | 0.17    |
|  |              | 2.             | SHINGLES          | 0.44    |
|  |              | 3.             | FELT UNDERLAYMENT | 0.06    |
|  |              | 4.             | 2" INSULATION     | 5.56    |
|  |              | 5.             | METAL DECK        | 0.00    |
|  |              | 6.             |                   |         |
|  |              | 7.             | INSIDE AIR FILM   | 0.68    |
|  |              | TOTAL R-ROOF = |                   | 6.91    |
|  |              | U=1/R          |                   | 0.145   |
|  |              |                |                   |         |
| GLASS TYPE:  | SINGLE PANE  | R-GLASS        | 0.90              |         |
| SLAB TYPE FLOOR:   | CONCRETE     | SLF            | 0.68              |         |
| BASEMENT TYPE:   | NONE         | R-BASEM.       | 0.00              |         |
| OVERHEAD DOOR TYPE:  | NONE         | R-ODOOR        | 0.00              |         |
| PERSONNEL DOOR TYPE:   | HOLLOW METAL | R-PDOOR        | 1.81              |         |

#### III. INFILTRATION:

|                                   |                       |        |                     |                          |       |   |     |
|-----------------------------------|-----------------------|--------|---------------------|--------------------------|-------|---|-----|
| iii. INFILTRATION:                |                       |        |                     |                          |       |   |     |
| WINDOWS (LF of Crack)             | 160 X 0.33 Sq.In./LF= | Sq.In. | 53                  | X CFM/Sq.In.             | 1.530 | = | 81  |
| PERSONNEL DOORS (SF)              | 462 X 0.16 Sq.In./SF= | Sq.In. | 74                  | X CFM/Sq.In.             | 1.530 | = | 113 |
|                                   |                       |        |                     |                          |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM / OPENING /HR |                          | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | 12                  | X CFM / OPENING /HR      | 1.385 | = | 17  |
|                                   |                       |        |                     | TOTAL INFILTRATION (CFM) |       | = | 211 |

|              |   |             |        |                     |       |   |       |
|--------------|---|-------------|--------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 0      | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 462    | X DOOR "U"          | 0.552 | = | 255   |
| UA WALL      | = | WALL AREA   | 8,563  | X WALL "U"          | 0.084 | = | 717   |
| UA ROOF      | = | ROOF AREA   | 20,736 | X ROOF "U"          | 0.145 | = | 3,001 |
| UA GLASS     | = | GLASS AREA  | 328    | X GLASS "U"         | 1.111 | = | 364   |
| UA SLAB      | = | SLAB PERIM. | 578    | X SLF               | 0.680 | = | 393   |
| UA BASEM.    | = | B-WALL AREA | 0      | X BASE. "U"         | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 211    | X A. T. F.          | 1.037 | = | 218   |
|              |   |             |        | TOTAL UA (BTU/HR*F) |       |   | 4,949 |



E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 18-Jul-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                     |        |            |                        |
|---------------------|--------|------------|------------------------|
| BLDG NO:            | 7285   | BLDG NAME: | THEATRE/CLOTHING SALES |
| BLDG FUNCTION:      |        |            |                        |
| FLOOR AREA (SQ. FT) | 18,272 | # FLOORS:  | 1 & 2                  |
| SLAB PERIMETER (FT) | 495    |            |                        |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST  | WEST     | TOTAL  |
|---|----------|-------|----------------|-------|----------|--------|
| WALLS, GROSS  | (SQ. FT) | 3,778 | 3,778          | 1,428 | 2,783    | 11,766 |
| GLASS   | (SQ. FT) | 0     | 0              | 0     | 28       | 28     |
| PERSONNEL DOOR  | (SQ. FT) | 63    | 63             | 0     | 126      | 252    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0     | 0        | 0      |
| WALLS, NET  | (SQ. FT) | 3,715 | 3,715          | 1,428 | 2,628    | 11,485 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) |          |       |                |       | (SQ. FT) | 18,272 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR |       | (SQ. FT) | 252    |
| BASEMENT WALLS  | (SQ. FT) |       |                |       |          |        |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS            | R-VALUE |
|---------------------------------------|--------------|-----------------------|---------|
|                                       |              | 1. OUTSIDE AIR FILM   | 0.17    |
|                                       |              | 2. 4' MASONRY UNITS   | 0.72    |
|                                       |              | 3. AIR SPACE          | 1.00    |
|                                       |              | 4. 6" MASONRY UNITS   | 0.92    |
|                                       |              | 5. 1/2" GYPSUM BOARD  | 0.45    |
|                                       |              | 6.                    |         |
|                                       |              | 7. INSIDE AIR FILM    | 0.68    |
|                                       |              | TOTAL R-WALL =        | 3.94    |
|                                       |              | U=1/R                 | 0.254   |
|                                       |              |                       |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS            | R-VALUE |
|                                       |              | 1. OUTSIDE AIR FILM   | 0.17    |
|                                       |              | 2. BUR                | 0.33    |
|                                       |              | 3. 2.5" CONCRETE DECK | 0.21    |
|                                       |              | 4. 1/2" GYPSUM BOARD  | 0.45    |
|                                       |              | 5.                    |         |
|                                       |              | 6.                    |         |
|                                       |              | 7. INSIDE AIR FILM    | 0.68    |
|                                       |              | TOTAL R-ROOF =        | 1.84    |
|                                       |              | U=1/R                 | 0.543   |
|                                       |              |                       |         |
| GLASS TYPE:                           | SINGLE PANE  | R-GLASS               | 0.90    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                   | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.              | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR               | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR               | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                          |              |       |   |    |
|-----------------------------------|-----------------------|--------|--------------------------|--------------|-------|---|----|
| WINDOWS (LF of Crack)             | 0 X 0.33 Sq.In./LF=   | Sq.In. | 0                        | X CFM/Sq.In. | 1.530 | = | 0  |
| PERSONNEL DOORS (SF)              | 252 X 0.16 Sq.In./SF= | Sq.In. | 40                       | X CFM/Sq.In. | 1.530 | = | 62 |
|                                   |                       |        |                          |              |       |   |    |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM / OPENING /HR      |              | 1.600 | = | 0  |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | X CFM / OPENING /HR      |              | 1.385 | = | 0  |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |              |       | = | 62 |

|              |   |             |                     |             |       |        |       |
|--------------|---|-------------|---------------------|-------------|-------|--------|-------|
| UA ODOOR     | = | ODOOR AREA  | 0                   | X DOOR "U"  | 0.000 | =      | 0     |
| UA PDOOR     | = | PDOOR AREA  | 252                 | X DOOR "U"  | 0.552 | =      | 139   |
| UA WALL      | = | WALL AREA   | 11,485              | X WALL "U"  | 0.254 | =      | 2,915 |
| UA ROOF      | = | ROOF AREA   | 18,272              | X ROOF "U"  | 0.543 | =      | 9,930 |
| UA GLASS     | = | GLASS AREA  | 28                  | X GLASS "U" | 1.111 | =      | 32    |
| UA SLAB      | = | SLAB PERIM. | 495                 | X SLF       | 0.680 | =      | 337   |
| UA BASEM.    | = | B-WALL AREA | 0                   | X BASE. "U" | 0.000 | =      | 0     |
| INFILTRATION | = | CFM         | 62                  | X A. T. F.  | 0.852 | =      | 53    |
|              |   |             | TOTAL UA (BTU/HR°F) |             |       | 13,405 |       |

E M C ENGINEERS, INC.  
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 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 18-Jul-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                |
|----------------------|--------|------------|----------------|
| BLDG NO:             | 7305   | BLDG NAME: | APP INSTR BLDG |
| BLDG FUNCTION:       |        |            |                |
| FLOOR AREA: (SQ. FT) | 11,520 | # FLOORS:  | 1              |
| SLAB PERIMETER: (FT) | 88     |            |                |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

| F. AREAS: ( [ ] FIELD VERIFIED ELEVATION PLANS)       |          | NORTH | SOUTH          | EAST | WEST     | TOTAL  |
|---|----------|-------|----------------|------|----------|--------|
| WALLS, GROSS  | (SQ. FT) | 2,281 | 2,281          | 811  | 811      | 6,183  |
| GLASS   | (SQ. FT) | 120   | 0              | 80   | 20       | 220    |
| PERSONNEL DOOR  | (SQ. FT) | 126   | 0              | 80   | 20       | 226    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 84   | 0        | 84     |
| WALLS, NET  | (SQ. FT) | 2,035 | 2,281          | 567  | 771      | 5,653  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) |          |       |                |      | (SQ. FT) | 11,520 |
| OVERHEAD DOOR   | (SQ. FT) | 84    | PERSONNEL DOOR |      | (SQ. FT) | 226    |
| BASEMENT WALLS  | (SQ. FT) |       |                |      |          | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|  |              |                          |         |
|--|--------------|--------------------------|---------|
| II. CONSTRUCTION: ( ) FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES) |              |                          |         |
| WALLS: (SKETCH CROSS SECTION OF WALL)                                |              | COMPONENTS               | R-VALUE |
|  |              | 1. OUTSIDE AIR FILM      | 0.17    |
|  |              | 2. 4" CMU                | 0.72    |
|  |              | 3. AIR SPACE             | 1.00    |
|  |              | 4. 6" LT WT CMU          | 0.92    |
|  |              | 5.                       |         |
|  |              | 6.                       |         |
|  |              | 7. INSIDE AIR FILM       | 0.68    |
|  |              | TOTAL R-WALL =           | 3.49    |
|  |              | U=1/R                    | 0.287   |
|  |              |                          |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                 |              | COMPONENTS               | R-VALUE |
|  |              | 1. OUTSIDE AIR FILM      | 0.17    |
|  |              | 2. BUR                   | 0.33    |
|  |              | 3. AIR SPACE             | 1.00    |
|  |              | 4. 2" RIGID INSUL.       | 5.56    |
|  |              | 5. 1/2" GYP. BD. CEILING | 0.45    |
|  |              | 6.                       |         |
|  |              | 7. INSIDE AIR FILM       | 0.68    |
|  |              | TOTAL R-ROOF =           | 8.19    |
|  |              | U=1/R                    | 0.122   |
|  |              |                          |         |
| GLASS TYPE:  | SINGLE PANE  | R-GLASS                  | 0.90    |
| SLAB TYPE FLOOR:   | CONCRETE     | SLF                      | 0.68    |
| BASEMENT TYPE:   | NONE         | R-BASEM.                 | 0.00    |
| OVERHEAD DOOR TYPE:  | NONE         | R-ODOOR                  | 0.00    |
| PERSONNEL DOOR TYPE:   | HOLLOW METAL | R-PDOOR                  | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |    |                          |       |   |     |
|-----------------------------------|-----------------------|--------|----|--------------------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 99 X 0.33 Sq.In./LF=  | Sq.In. | 33 | X CFM/Sq.In.             | 1.530 | = | 50  |
| PERSONNEL DOORS (SF)              | 226 X 0.16 Sq.In./SF= | Sq.In. | 36 | X CFM/Sq.In.             | 1.530 | = | 55  |
|                                   |                       |        |    |                          |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        |    | X CFM /OPENING /HR       | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        |    | X CFM /OPENING /HR       | 1.385 | = | 0   |
|                                   |                       |        |    | TOTAL INFILTRATION (CFM) |       | = | 105 |

|              |   |             |        |                     |       |   |       |
|--------------|---|-------------|--------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 84     | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 226    | X DOOR "U"          | 0.552 | = | 125   |
| UA WALL      | = | WALL AREA   | 5,653  | X WALL "U"          | 0.287 | = | 1,620 |
| UA ROOF      | = | ROOF AREA   | 11,520 | X ROOF "U"          | 0.122 | = | 1,407 |
| UA GLASS     | = | GLASS AREA  | 220    | X GLASS "U"         | 1.111 | = | 244   |
| UA SLAB      | = | SLAB PERIM. | 88     | X SLF               | 0.680 | = | 60    |
| UA BASEM.    | = | B-WALL AREA | 0      | X BASE. "U"         | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 105    | X A. T. F.          | 0.852 | = | 90    |
|              |   |             |        | TOTAL UA (BTU/HR°F) |       |   | 3,545 |

E M C ENGINEERS, INC.  
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 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                  |
|----------------------|--------|------------|------------------|
| BLDG NO:             | 7350   | BLDG NAME: | VEH MNT SHOP ORG |
| BLDG FUNCTION:       |        |            |                  |
| FLOOR AREA: (SQ. FT) | 22,345 | # FLOORS:  | 1                |
| SLAB PERIMETER: (FT) | 994    |            |                  |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH  | SOUTH          | EAST  | WEST     | TOTAL  |
|---|----------|--------|----------------|-------|----------|--------|
| WALLS, GROSS  | (SQ. FT) | 7,865  | 7,865          | 6,696 | 6,696    | 29,121 |
| GLASS   | (SQ. FT) | 112    | 96             | 720   | 440      | 1,368  |
| PERSONNEL DOOR  | (SQ. FT) | 84     | 21             | 189   | 270      | 564    |
| OVERHEAD DOOR   | (SQ. FT) | 3,080  | 3,080          | 2,080 | 2,080    | 10,320 |
| WALLS, NET  | (SQ. FT) | 4,589  | 4,668          | 3,707 | 3,906    | 16,869 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |        |                |       |          | 20,345 |
| OVERHEAD DOOR   | (SQ. FT) | 10,320 | PERSONNEL DOOR |       | (SQ. FT) | 564    |
| BASEMENT WALLS  | (SQ. FT) |        |                |       |          | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|                                       |                     |         |
|---------------------------------------|---------------------|---------|
| WALLS: (SKETCH CROSS SECTION OF WALL) | COMPONENTS          | R-VALUE |
| COMPONENTS:                           | 1. N WALL           | 3.09    |
| 12" MASONRY UNITS = 3.7               | 2. S WALL           | 3.09    |
| INSULATED METAL PANELS = 7.33         | 3. E WALL           | 6.22    |
| BAY DOORS = .07                       | 4. W WALL           | 7.10    |
| OA FILM = .17                         | 5.                  |         |
| IA FILM = .68                         | 6.                  |         |
|                                       | 7. INSIDE AIR FILM  | 0.68    |
|                                       | TOTAL R-WALL =      | 20.18   |
|                                       | U=1/R               | 0.050   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  | COMPONENTS          | R-VALUE |
|                                       | 1. OUTSIDE AIR FILM | 0.17    |
|                                       | 2. 5 PLY BUR        | 0.33    |
|                                       | 3. 2" RIGID INSUL   | 5.56    |
|                                       | 4.                  |         |
|                                       | 5.                  |         |
|                                       | 6.                  |         |
|                                       | 7. INSIDE AIR FILM  | 0.68    |
|                                       | TOTAL R-ROOF =      | 6.74    |
|                                       | U=1/R               | 0.148   |
| GLASS TYPE: SINGLE PANE               | R-GLASS             | 0.90    |
| SLAB TYPE FLOOR: CONCRETE             | SLF                 | 0.68    |
| BASEMENT TYPE: NONE                   | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE: INSULATED METAL   | R-ODOOR             | 7.33    |
| PERSONNEL DOOR TYPE: HOLLOW METAL     | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |       |                          |       |   |      |
|-----------------------------------|-----------------------|--------|-------|--------------------------|-------|---|------|
| WINDOWS (LF of Crack)             | 908 X 0.33 Sq.In./LF= | Sq.In. | 300   | X CFM/Sq.In.             | 1.530 | = | 458  |
| PERSONNEL DOORS (SF)              | 564 X 0.16 Sq.In./SF= | Sq.In. | 90    | X CFM/Sq.In.             | 1.530 | = | 138  |
| OVERHEAD DOORS (SF)               |                       |        | 10320 | X CFM/Sq.Ft.             | 0.114 | = | 1176 |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        |       | X CFM / OPENING / HR     | 1.600 | = | 0    |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        |       | X CFM / OPENING / HR     | 1.385 | = | 0    |
|                                   |                       |        |       | TOTAL INFILTRATION (CFM) |       | = | 1773 |

|              |   |             |        |                     |       |   |       |
|--------------|---|-------------|--------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 10,320 | X DOOR "U"          | 0.136 | = | 1,408 |
| UA PDOOR     | = | PDOOR AREA  | 564    | X DOOR "U"          | 0.552 | = | 312   |
| UA WALL      | = | WALL AREA   | 16,869 | X WALL "U"          | 0.050 | = | 836   |
| UA ROOF      | = | ROOF AREA   | 20,345 | X ROOF "U"          | 0.148 | = | 3,019 |
| UA GLASS     | = | GLASS AREA  | 1,368  | X GLASS "U"         | 1.111 | = | 1,520 |
| UA SLAB      | = | SLAB PERIM. | 994    | X SLF               | 0.680 | = | 676   |
| UA BASEM.    | = | B-WALL AREA | 0      | X BASE. "U"         | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 1773   | X A. T. F.          | 0.852 | = | 1,511 |
|              |   |             |        | TOTAL UA (BTU/HR°F) |       | = | 9,281 |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |          |            |                      |
|----------------------|----------|------------|----------------------|
| BLDG NO:             | 7404     | BLDG NAME: | ENL BARRACKS W/O DIN |
| BLDG FUNCTION:       | BARRACKS |            |                      |
| FLOOR AREA: (SQ. FT) | 50,730   | # FLOORS:  | 3                    |
| SLAB PERIMETER: (FT) | 0        |            |                      |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL  |
|---|----------|---------|----------------|----------|---------|--------|
| WALLS, GROSS  | (SQ. FT) | 1,845   | 9,088          | 9,088    | 1,845   | 21,866 |
| GLASS   | (SQ. FT) | 124     | 2,740          | 2,896    | 124     | 5,884  |
| PERSONNEL DOOR  | (SQ. FT) | 0       | 42             | 84       | 0       | 126    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0      |
| WALLS, NET  | (SQ. FT) | 1,721   | 6,306          | 6,108    | 1,721   | 15,856 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 19,342 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) |         | 126    |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 4,928  |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

II. CONSTRUCTION: ( [ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) | COMPONENTS              | R-VALUE  |       |
|---------------------------------------|-------------------------|----------|-------|
|                                       | 1. OUTSIDE AIR FILM     | 0.17     |       |
|                                       | 2. BRICK                | 1.20     |       |
|                                       | 3. AIR SPACE            | 1.00     |       |
|                                       | 4. GSU                  | 0.72     |       |
|                                       | 5.                      |          |       |
|                                       | 6.                      |          |       |
|                                       | 7. INSIDE AIR FILM      | 0.68     |       |
|                                       | TOTAL R-WALL =          | 3.77     |       |
|                                       | U=1/R                   | 0.265    |       |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  | COMPONENTS              | R-VALUE  |       |
|                                       | 1. OUTSIDE AIR FILM     | 0.17     |       |
|                                       | 2. BUILT UP ROOF        | 0.34     |       |
|                                       | 3. RIGID INSULATION, 2" | 5.56     |       |
|                                       | 4.                      |          |       |
|                                       | 5.                      |          |       |
|                                       | 6.                      |          |       |
|                                       | 7. INSIDE AIR FILM      | 0.68     |       |
|                                       | TOTAL R-ROOF =          | 6.75     |       |
|                                       | U=1/R                   | 0.148    |       |
| GLASS TYPE:                           | SINGLE PANE             | R-GLASS  | 0.90  |
| SLAB TYPE FLOOR:                      | CONCRETE                | SLF      | 0.68  |
| BASEMENT TYPE:                        | CONCRETE & SOIL         | R-BASEM. | 10.00 |
| OVERHEAD DOOR TYPE:                   | NONE                    | R-ODOOR  | 0.00  |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL            | R-PDOOR  | 1.81  |

#### III. INFILTRATION:

|                                   |                        |                      |                          |              |       |      |      |
|-----------------------------------|------------------------|----------------------|--------------------------|--------------|-------|------|------|
| iii. INFILTRATION:                |                        |                      |                          |              |       |      |      |
| WINDOWS (LF of Crack)             | 8270 X 0.33 Sq.In./LF= | Sq.In.               | 2729                     | X CFM/Sq.In. | 1.530 | =    | 4176 |
| PERSONNEL DOORS (SF)              | 126 X 0.16 Sq.In./SF=  | Sq.In.               | 20                       | X CFM/Sq.In. | 1.530 | =    | 31   |
|                                   |                        |                      |                          |              |       |      |      |
| DOOR OPENINGS / HR - SINGLE DOOR  | 4                      | X CFM / OPENING / HR | 1.600                    | =            | 6     |      |      |
| DOOR OPENINGS / HR - DOUBLE DOORS | 8                      | X CFM / OPENING / HR | 1.385                    | =            | 11    |      |      |
|                                   |                        |                      | TOTAL INFILTRATION (CFM) |              | =     | 4224 |      |

|                     |   |             |        |             |       |   |        |
|---------------------|---|-------------|--------|-------------|-------|---|--------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0      |
| UA PDOOR            | = | PDOOR AREA  | 126    | X DOOR "U"  | 0.552 | = | 70     |
| UA WALL             | = | WALL AREA   | 15,856 | X WALL "U"  | 0.265 | = | 4,206  |
| UA ROOF             | = | ROOF AREA   | 19,342 | X ROOF "U"  | 0.148 | = | 2,868  |
| UA GLASS            | = | GLASS AREA  | 5,884  | X GLASS "U" | 1.111 | = | 6,538  |
| UA SLAB             | = | SLAB PERIM. | 0      | X SLF       | 0.680 | = | 0      |
| UA BASEM.           | = | B-WALL AREA | 4,928  | X BASE "U"  | 0.100 | = | 493    |
| INFILTRATION        | = | CFM         | 4224   | X A. T. F.  | 1.037 | = | 4,380  |
| TOTAL UA (BTU/HR°F) |   |             |        |             |       |   | 18,554 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |          |            |                      |
|----------------------|----------|------------|----------------------|
| BLDG NO:             | 7424     | BLDG NAME: | ENL BARRACKS W/O DIN |
| BLDG FUNCTION:       | BARRACKS |            |                      |
| FLOOR AREA: (SQ. FT) | 50,730   | # FLOORS:  | 3                    |
| SLAB PERIMETER: (FT) | 0        |            |                      |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W | SOUTH-E  | TOTAL  |
|---|----------|---------|----------------|---------|----------|--------|
| WALLS, GROSS  | (SQ. FT) | 9,088   | 1,845          | 1,845   | 9,088    | 21,866 |
| GLASS   | (SQ. FT) | 2,896   | 124            | 124     | 2,740    | 5,884  |
| PERSONNEL DOOR  | (SQ. FT) | 84      | 0              | 0       | 42       | 126    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0       | 0        | 0      |
| WALLS, NET  | (SQ. FT) | 6,108   | 1,721          | 1,721   | 6,306    | 15,856 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) |          |         |                |         | (SQ. FT) | 19,342 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR |         | (SQ. FT) | 126    |
| BASEMENT WALLS  | (SQ. FT) |         |                |         |          | 4,928  |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |                      | COMPONENTS              | R-VALUE |
|---------------------------------------|----------------------|-------------------------|---------|
|                                       |                      | 1. OUTSIDE AIR FILM     | 0.17    |
|                                       |                      | 2. BRICK                | 1.20    |
|                                       |                      | 3. AIR SPACE            | 1.00    |
|                                       |                      | 4. GSU                  | 0.72    |
|                                       |                      | 5.                      |         |
|                                       |                      | 6.                      |         |
|                                       |                      | 7. INSIDE AIR FILM      | 0.68    |
|                                       |                      | TOTAL R-WALL =          | 3.77    |
|                                       |                      | U=1/R                   | 0.265   |
|                                       |                      |                         |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |                      | COMPONENTS              | R-VALUE |
|                                       |                      | 1. OUTSIDE AIR FILM     | 0.17    |
|                                       |                      | 2. BUILT UP ROOF        | 0.34    |
|                                       |                      | 3. RIGID INSULATION, 2" | 5.56    |
|                                       |                      | 4.                      |         |
|                                       |                      | 5.                      |         |
|                                       |                      | 6.                      |         |
|                                       |                      | 7. INSIDE AIR FILM      | 0.68    |
|                                       |                      | TOTAL R-ROOF =          | 6.75    |
|                                       |                      | U=1/R                   | 0.148   |
|                                       |                      |                         |         |
| GLASS TYPE:                           | SINGLE PANE W/STORMS | R-GLASS                 | 1.60    |
| SLAB TYPE FLOOR:                      | CONCRETE             | SLF                     | 0.68    |
| BASEMENT TYPE:                        | CONCRETE             | R-BASEM.                | 10.00   |
| OVERHEAD DOOR TYPE:                   | NONE                 | R-ODOOR                 | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL         | R-PDOOR                 | 1.81    |

#### III. INFILTRATION:

|                                   |                        |                      |       |                          |       |   |      |
|-----------------------------------|------------------------|----------------------|-------|--------------------------|-------|---|------|
| WINDOWS (LF of Crack)             | 8270 X 0.33 Sq.In./LF= | Sq.In.               | 2729  | X CFM/Sq.In.             | 1.530 | = | 4176 |
| PERSONNEL DOORS (SF)              | 126 X 0.16 Sq.In./SF=  | Sq.In.               | 20    | X CFM/Sq.In.             | 1.530 | = | 31   |
|                                   |                        |                      |       |                          |       |   |      |
| DOOR OPENINGS / HR - SINGLE DOOR  | 4                      | X CFM / OPENING / HR | 1.600 | =                        | 6     |   |      |
| DOOR OPENINGS / HR - DOUBLE DOORS | 8                      | X CFM / OPENING / HR | 1.385 | =                        | 11    |   |      |
|                                   |                        |                      |       | TOTAL INFILTRATION (CFM) |       | = | 4224 |

|              |   |             |        |                     |       |   |        |
|--------------|---|-------------|--------|---------------------|-------|---|--------|
| UA ODOOR     | = | ODOOR AREA  | 0      | X DOOR "U"          | 0.000 | = | 0      |
| UA PDOOR     | = | PDOOR AREA  | 126    | X DOOR "U"          | 0.552 | = | 70     |
| UA WALL      | = | WALL AREA   | 15,856 | X WALL "U"          | 0.265 | = | 4,206  |
| UA ROOF      | = | ROOF AREA   | 19,342 | X ROOF "U"          | 0.148 | = | 2,868  |
| UA GLASS     | = | GLASS AREA  | 5,884  | X GLASS "U"         | 0.625 | = | 3,678  |
| UA SLAB      | = | SLAB PERIM. | 0      | X SLF               | 0.680 | = | 0      |
| UA BASEM.    | = | B-WALL AREA | 4,928  | X BASE "U"          | 0.100 | = | 493    |
| INFILTRATION | = | CFM         | 4224   | X A. T. F.          | 1.037 | = | 4,380  |
|              |   |             |        | TOTAL UA (BTU/HR°F) |       |   | 15,693 |

E M C ENGINEERS, INC  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 18-Jul-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |               |
|----------------------|--------|------------|---------------|
| BLDG NO:             | 7485   | BLDG NAME: | BOWLING ALLEY |
| BLDG FUNCTION:       | REC    |            |               |
| FLOOR AREA: (SQ. FT) | 16,112 | # FLOORS:  | 1             |
| SLAB PERIMETER: (FT) | 516    |            |               |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH | EAST  | WEST  | TOTAL  |
|---|----------|-------|-------|-------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 2,968 | 2,968 | 4,256 | 4,256 | 14,448 |
| GLASS   | (SQ. FT) | 0     | 192   | 0     | 0     | 192    |
| PERSONNEL DOOR  | (SQ. FT) | 42    | 84    | 21    | 21    | 168    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0     | 0     | 0     | 0      |
| WALLS, NET  | (SQ. FT) | 2,926 | 2,692 | 4,235 | 4,235 | 14,088 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |       |       |       | 16,112 |
| OVERHEAD DOOR   | (SQ. FT) | 0     |       |       |       | 168    |
| BASEMENT WALLS  | (SQ. FT) |       |       |       |       | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

II. CONSTRUCTION: ( [ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) | COMPONENTS             | R-VALUE  |      |
|---------------------------------------|------------------------|----------|------|
|                                       | 1. OUTSIDE AIR FILM    | 0.17     |      |
|                                       | 2. 4" FACE BRICK       | 1.20     |      |
|                                       | 3. 2" RIGID INSULATION | 5.56     |      |
|                                       | 4. AIR SPACE           | 1.00     |      |
|                                       | 5. 8" CMU              | 1.11     |      |
|                                       | 6.                     |          |      |
|                                       | 7. INSIDE AIR FILM     | 0.68     |      |
|                                       | TOTAL R-WALL =         | 9.72     |      |
|                                       | U=1/R                  | 0.103    |      |
|                                       |                        |          |      |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  | COMPONENTS             | R-VALUE  |      |
|                                       | 1. OUTSIDE AIR FILM    | 0.17     |      |
|                                       | 2. 3/16" EPDM ROOF     | 0.85     |      |
|                                       | 3. 1-1/2" STEEL DECK   | 0.00     |      |
|                                       | 4. 3" RIGID INSUL      | 8.34     |      |
|                                       | 5. VAPOR BARRIER       | 0.00     |      |
|                                       | 6.                     |          |      |
|                                       | 7. INSIDE AIR FILM     | 0.68     |      |
|                                       | TOTAL R-ROOF =         | 10.04    |      |
|                                       | U=1/R                  | 0.100    |      |
|                                       |                        |          |      |
| GLASS TYPE:                           | DOUBLE PANE            | R-GLASS  | 1.75 |
| SLAB TYPE FLOOR:                      | CONCRETE               | SLF      | 0.68 |
| BASEMENT TYPE:                        | NONE                   | R-BASEM. | 0.00 |
| OVERHEAD DOOR TYPE:                   | NONE                   | R-ODOOR  | 0.00 |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL           | R-PDOOR  | 1.81 |

#### III. INFILTRATION:

|                                   |                       |        |    |                          |       |   |    |
|-----------------------------------|-----------------------|--------|----|--------------------------|-------|---|----|
| WINDOWS (LF of Crack)             | 30 X 0.27 Sq.In./LF=  | Sq.In. | 8  | X CFM/Sq.In.             | 1.530 | = | 12 |
| PERSONNEL DOORS (SF)              | 168 X 0.16 Sq.In./SF= | Sq.In. | 27 | X CFM/Sq.In.             | 1.530 | = | 41 |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        |    | X CFM / OPENING / HR     | 1.600 | = | 0  |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        |    | X CFM / OPENING / HR     | 1.385 | = | 0  |
|                                   |                       |        |    | TOTAL INFILTRATION (CFM) |       | = | 54 |

|              |   |             |        |                     |       |   |       |
|--------------|---|-------------|--------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 0      | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 168    | X DOOR "U"          | 0.552 | = | 93    |
| UA WALL      | = | WALL AREA   | 14,088 | X WALL "U"          | 0.103 | = | 1,449 |
| UA ROOF      | = | ROOF AREA   | 16,112 | X ROOF "U"          | 0.100 | = | 1,605 |
| UA GLASS     | = | GLASS AREA  | 192    | X GLASS "U"         | 0.571 | = | 110   |
| UA SLAB      | = | SLAB PERIM. | 516    | X SLF               | 0.680 | = | 351   |
| UA BASEM.    | = | B-WALL AREA | 0      | X BASE "U"          | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 54     | X A. T. F.          | 0.852 | = | 46    |
|              |   |             |        | TOTAL UA (BTU/HR°F) |       |   | 3,653 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 18-Jul-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |               |
|----------------------|--------|------------|---------------|
| BLDG NO:             | 7604   | BLDG NAME: | GEN INST BLDG |
| BLDG FUNCTION:       |        |            |               |
| FLOOR AREA: (SQ. FT) | 11,404 | # FLOORS:  | 1             |
| SLAB PERIMETER: (FT) |        |            |               |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL  |
|---|----------|---------|----------------|----------|---------|--------|
| WALLS, GROSS  | (SQ. FT) | 2,514   | 1,716          | 1,716    | 2,514   | 8,459  |
| GLASS   | (SQ. FT) | 431     | 240            | 84       | 455     | 1,210  |
| PERSONNEL DOOR  | (SQ. FT) | 63      | 0              | 42       | 84      | 189    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0      |
| WALLS, NET  | (SQ. FT) | 2,020   | 1,476          | 1,590    | 1,975   | 7,060  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 11,404 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) | 189     |        |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS             | R-VALUE |
|---------------------------------------|--------------|------------------------|---------|
|                                       |              | 1. OUTSIDE AIR FILM    | 0.17    |
|                                       |              | 2. 4" BRICK            | 1.20    |
|                                       |              | 3. 2" AIR SPACE        | 1.00    |
|                                       |              | 4. 1" RIGID INSULATION | 2.78    |
|                                       |              | 5. 8" CMU              | 1.11    |
|                                       |              | 6. 1/2" GYPSUM BOARD   | 0.45    |
|                                       |              | 7. INSIDE AIR FILM     | 0.68    |
|                                       |              | TOTAL R-WALL =         | 7.39    |
|                                       |              | U=1/R                  | 0.135   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS             | R-VALUE |
|                                       |              | 1. OUTSIDE AIR FILM    | 0.17    |
|                                       |              | 2. BUR                 | 0.33    |
|                                       |              | 3. 3" RIGID INSUL.     | 8.34    |
|                                       |              | 4. AIR SPACE           | 1.00    |
|                                       |              | 5. 1/2" GWB            | 0.45    |
|                                       |              | 6.                     |         |
|                                       |              | 7. INSIDE AIR FILM     | 0.68    |
|                                       |              | TOTAL R-ROOF =         | 10.97   |
|                                       |              | U=1/R                  | 0.091   |
| GLASS TYPE:                           | SINGLE PANE  | R-GLASS                | 0.90    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                    | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.               | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR                | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR                | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |    |                          |       |   |     |
|-----------------------------------|-----------------------|--------|----|--------------------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 216 X 0.33 Sq.In./LF= | Sq.In. | 71 | X CFM/Sq.In.             | 1.530 | = | 109 |
| PERSONNEL DOORS (SF)              | 189 X 0.16 Sq.In./SF= | Sq.In. | 30 | X CFM/Sq.In.             | 1.530 | = | 46  |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        |    | X CFM /OPENING /HR       | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        |    | X CFM /OPENING /HR       | 1.385 | = | 0   |
|                                   |                       |        |    | TOTAL INFILTRATION (CFM) |       | = | 155 |

|              |   |             |        |                     |       |   |       |
|--------------|---|-------------|--------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 0      | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 189    | X DOOR "U"          | 0.552 | = | 104   |
| UA WALL      | = | WALL AREA   | 7,060  | X WALL "U"          | 0.135 | = | 955   |
| UA ROOF      | = | ROOF AREA   | 11,404 | X ROOF "U"          | 0.091 | = | 1,040 |
| UA GLASS     | = | GLASS AREA  | 1,210  | X GLASS "U"         | 1.111 | = | 1,344 |
| UA SLAB      | = | SLAB PERIM. | 0      | X SLF               | 0.680 | = | 0     |
| UA BASEM.    | = | B-WALL AREA | 0      | X BASE. "U"         | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 155    | X A. T. F.          | 0.852 | = | 132   |
|              |   |             |        | TOTAL UA (BTU/HR*F) |       |   | 3,576 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |          |            |                      |
|----------------------|----------|------------|----------------------|
| BLDG NO:             | 7610     | BLDG NAME: | ENL BARRACKS W/O DIN |
| BLDG FUNCTION:       | BARRACKS |            |                      |
| FLOOR AREA: (SQ. FT) | 40,986   | # FLOORS:  | 3                    |
| SLAB PERIMETER: (FT) | 0        |            |                      |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL  |
|---|----------|---------|----------------|----------|---------|--------|
| WALLS, GROSS  | (SQ. FT) | 1,845   | 9,088          | 9,088    | 1,845   | 21,866 |
| GLASS   | (SQ. FT) | 124     | 2,740          | 2,896    | 124     | 5,884  |
| PERSONNEL DOOR  | (SQ. FT) | 0       | 42             | 84       | 0       | 126    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0      |
| WALLS, NET  | (SQ. FT) | 1,721   | 6,306          | 6,108    | 1,721   | 15,856 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 19,342 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) |         | 126    |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|   |                      |                         |         |
|---|----------------------|-------------------------|---------|
| II. CONSTRUCTION: ( ) FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPE: |                      |                         |         |
| WALLS: (SKETCH CROSS SECTION OF WALL)                               |                      | COMPONENTS              | R-VALUE |
|   |                      | 1. OUTSIDE AIR FILM     | 0.17    |
|   |                      | 2. BRICK                | 1.20    |
|   |                      | 3. AIR SPACE            | 1.00    |
|   |                      | 4. GSU                  | 0.72    |
|   |                      | 5.                      |         |
|   |                      | 6.                      |         |
|   |                      | 7. INSIDE AIR FILM      | 0.68    |
|   |                      | TOTAL R-WALL =          | 3.77    |
|   |                      | U=1/R                   | 0.265   |
|   |                      |                         |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                |                      | COMPONENTS              | R-VALUE |
|   |                      | 1. OUTSIDE AIR FILM     | 0.17    |
|   |                      | 2. BUILT UP ROOF        | 0.34    |
|   |                      | 3. RIGID INSULATION, 2" | 5.56    |
|   |                      | 4.                      |         |
|   |                      | 5.                      |         |
|   |                      | 6.                      |         |
|   |                      | 7. INSIDE AIR FILM      | 0.68    |
|   |                      | TOTAL R-ROOF =          | 6.75    |
|   |                      | U=1/R                   | 0.148   |
|   |                      |                         |         |
| GLASS TYPE:   | SINGLE PANE W/STORMS | R-GLASS                 | 1.60    |
| SLAB TYPE FLOOR:  | CONCRETE             | SLF                     | 0.68    |
| BASEMENT TYPE:  | CONCRETE             | R-BASEM.                | 10.00   |
| OVERHEAD DOOR TYPE:   | NONE                 | R-ODOOR                 | 0.00    |
| PERSONNEL DOOR TYPE:  | HOLLOW METAL         | R-PDOOR                 | 1.81    |

#### III. INFILTRATION:

|                                   |                        |        |                          |              |       |   |      |
|-----------------------------------|------------------------|--------|--------------------------|--------------|-------|---|------|
| INFILTRATION:                     |                        |        |                          |              |       |   |      |
| WINDOWS (LF of Crack)             | 8270 X 0.33 Sq.In./LF= | Sq.In. | 2729                     | X CFM/Sq.In. | 1.530 | = | 4176 |
| PERSONNEL DOORS (SF)              | 126 X 0.16 Sq.In./SF=  | Sq.In. | 20                       | X CFM/Sq.In. | 1.530 | = | 31   |
|                                   |                        |        |                          |              |       |   |      |
| DOOR OPENINGS / HR - SINGLE DOOR  |                        | 4      | X CFM /OPENING /HR       | 1.600        | =     |   | 6    |
| DOOR OPENINGS / HR - DOUBLE DOORS |                        | 8      | X CFM /OPENING /HR       | 1.385        | =     |   | 11   |
|                                   |                        |        | TOTAL INFILTRATION (CFM) |              |       | = | 4224 |

|              |   |             |                     |             |       |   |        |
|--------------|---|-------------|---------------------|-------------|-------|---|--------|
| UA ODOOR     | = | ODOOR AREA  | 0                   | X DOOR "U"  | 0.000 | = | 0      |
| UA PDOOR     | = | PDOOR AREA  | 126                 | X DOOR "U"  | 0.552 | = | 70     |
| UA WALL      | = | WALL AREA   | 15,856              | X WALL "U"  | 0.265 | = | 4,206  |
| UA ROOF      | = | ROOF AREA   | 19,342              | X ROOF "U"  | 0.148 | = | 2,868  |
| UA GLASS     | = | GLASS AREA  | 5,884               | X GLASS "U" | 0.625 | = | 3,678  |
| UA SLAB      | = | SLAB PERIM. | 0                   | X SLF       | 0.680 | = | 0      |
| UA BASEM.    | = | B-WALL AREA | 0                   | X BASE. "U" | 0.100 | = | 0      |
| INFILTRATION | = | CFM         | 4224                | X A. T. F.  | 1.037 | = | 4,380  |
|              |   |             | TOTAL UA (BTU/HR*F) |             |       | = | 15,201 |



E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |          |            |                      |
|----------------------|----------|------------|----------------------|
| BLDG NO:             | 7618     | BLDG NAME: | ENL BARRACKS W/O DIN |
| BLDG FUNCTION:       | BARRACKS |            |                      |
| FLOOR AREA: (SQ. FT) | 40,986   | # FLOORS:  | 3                    |
| SLAB PERIMETER: (FT) | 0        |            |                      |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL  |
|---|----------|---------|----------------|----------|---------|--------|
| WALLS, GROSS  | (SQ. FT) | 1,845   | 9,088          | 9,088    | 1,845   | 21,866 |
| GLASS   | (SQ. FT) | 124     | 2,740          | 2,896    | 124     | 5,884  |
| PERSONNEL DOOR  | (SQ. FT) | 0       | 42             | 84       | 0       | 126    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0      |
| WALLS, NET  | (SQ. FT) | 1,721   | 6,306          | 6,108    | 1,721   | 15,856 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 19,342 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) |         | 126    |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|                                       |                      |                         |         |
|---------------------------------------|----------------------|-------------------------|---------|
| WALLS: (SKETCH CROSS SECTION OF WALL) |                      | COMPONENTS              | R-VALUE |
|                                       |                      | 1. OUTSIDE AIR FILM     | 0.17    |
|                                       |                      | 2. BRICK                | 1.20    |
|                                       |                      | 3. AIR SPACE            | 1.00    |
|                                       |                      | 4. GSU                  | 0.72    |
|                                       |                      | 5.                      |         |
|                                       |                      | 6.                      |         |
|                                       |                      | 7. INSIDE AIR FILM      | 0.68    |
|                                       |                      | TOTAL R-WALL =          | 3.77    |
|                                       |                      | U=1/R                   | 0.265   |
|                                       |                      |                         |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |                      | COMPONENTS              | R-VALUE |
|                                       |                      | 1. OUTSIDE AIR FILM     | 0.17    |
|                                       |                      | 2. BUILT UP ROOF        | 0.34    |
|                                       |                      | 3. RIGID INSULATION, 2" | 5.56    |
|                                       |                      | 4.                      |         |
|                                       |                      | 5.                      |         |
|                                       |                      | 6.                      |         |
|                                       |                      | 7. INSIDE AIR FILM      | 0.68    |
|                                       |                      | TOTAL R-ROOF =          | 6.75    |
|                                       |                      | U=1/R                   | 0.148   |
|                                       |                      |                         |         |
| GLASS TYPE:                           | SINGLE PANE W/STORMS | R-GLASS                 | 1.60    |
| SLAB TYPE FLOOR:                      | CONCRETE             | SLF                     | 0.68    |
| BASEMENT TYPE:                        | CONCRETE             | R-BASEM.                | 10.00   |
| OVERHEAD DOOR TYPE:                   | NONE                 | R-ODOOR                 | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL         | R-PDOOR                 | 1.81    |

#### III. INFILTRATION:

|                                   |                        |        |                          |              |       |   |      |
|-----------------------------------|------------------------|--------|--------------------------|--------------|-------|---|------|
| WINDOWS (LF of Crack)             | 8270 X 0.33 Sq.In./LF= | Sq.In. | 2729                     | X CFM/Sq.In. | 1.530 | = | 4176 |
| PERSONNEL DOORS (SF)              | 126 X 0.16 Sq.In./SF=  | Sq.In. | 20                       | X CFM/Sq.In. | 1.530 | = | 31   |
|                                   |                        |        |                          |              |       |   |      |
| DOOR OPENINGS / HR - SINGLE DOOR  |                        | 4      | X CFM /OPENING /HR       | 1.600        | =     |   | 6    |
| DOOR OPENINGS / HR - DOUBLE DOORS |                        | 8      | X CFM /OPENING /HR       | 1.385        | =     |   | 11   |
|                                   |                        |        | TOTAL INFILTRATION (CFM) |              | =     |   | 4224 |

|                     |   |             |        |             |       |   |        |
|---------------------|---|-------------|--------|-------------|-------|---|--------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0      |
| UA PDOOR            | = | PDOOR AREA  | 126    | X DOOR "U"  | 0.552 | = | 70     |
| UA WALL             | = | WALL AREA   | 15,856 | X WALL "U"  | 0.265 | = | 4,206  |
| UA ROOF             | = | ROOF AREA   | 19,342 | X ROOF "U"  | 0.148 | = | 2,868  |
| UA GLASS            | = | GLASS AREA  | 5,884  | X GLASS "U" | 0.625 | = | 3,678  |
| UA SLAB             | = | SLAB PERIM. | 0      | X SLF       | 0.680 | = | 0      |
| UA BASEM.           | = | B-WALL AREA | 0      | X BASE. "U" | 0.100 | = | 0      |
| INFILTRATION        | = | CFM         | 4224   | X A. T. F.  | 1.037 | = | 4,380  |
| TOTAL UA (BTU/HR°F) |   |             |        |             |       |   | 15,201 |

E M C ENGINEERS, INC.  
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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |                 |
|----------------------|-------|------------|-----------------|
| BLDG NO:             | 7620  | BLDG NAME: | BN ADMIN & CLRM |
| BLDG FUNCTION:       |       |            |                 |
| FLOOR AREA: (SQ. FT) | 6,255 | # FLOORS:  | 1               |
| SLAB PERIMETER: (FT) | 345   |            |                 |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL |
|---|----------|---------|----------------|----------|---------|-------|
| WALLS, GROSS  | (SQ. FT) | 1,176   | 900            | 900      | 1,176   | 4,152 |
| GLASS   | (SQ. FT) | 90      | 0              | 120      | 120     | 330   |
| PERSONNEL DOOR  | (SQ. FT) | 0       | 0              | 42       | 0       | 42    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0     |
| WALLS, NET  | (SQ. FT) | 1,086   | 900            | 738      | 1,056   | 3,780 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 6,255 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) |         | 42    |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|  |  |                |                       |          |      |
|--|--|----------------|-----------------------|----------|------|
| II. CONSTRUCTION: (FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPE) |  | COMPONENTS     |                       | R-VALUE  |      |
| WALLS: (SKETCH CROSS SECTION OF WALL)                            |  |                |                       |          |      |
|  |  | 1.             | OUTSIDE AIR FILM      | 0.17     |      |
|  |  | 2.             | 4" BRICK              | 1.20     |      |
|  |  | 3.             | 2" AIR SPACE          | 1.00     |      |
|  |  | 4.             | 4" CMU                | 0.72     |      |
|  |  | 5.             |                       |          |      |
|  |  | 6.             |                       |          |      |
|  |  | 7.             | INSIDE AIR FILM       | 0.68     |      |
|  |  | TOTAL R-WALL = |                       | 3.77     |      |
|  |  | U=1/R          |                       | 0.265    |      |
|  |  |                |                       |          |      |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                             |  | COMPONENTS     |                       | R-VALUE  |      |
|  |  | 1.             | OUTSIDE AIR FILM      | 0.17     |      |
|  |  | 2.             | BUR                   | 0.33     |      |
|  |  | 3.             | 2" RIGID INSUL        | 5.56     |      |
|  |  | 4.             | AIR SPACE             | 1.00     |      |
|  |  | 5.             | ACOUSTIC TILE CEILING | 1.25     |      |
|  |  | 6.             |                       |          |      |
|  |  | 7.             | INSIDE AIR FILM       | 0.68     |      |
|  |  | TOTAL R-ROOF = |                       | 8.99     |      |
|  |  | U=1/R          |                       | 0.111    |      |
|  |  |                |                       |          |      |
| GLASS TYPE:  |  | SINGLE PANE    |                       | R-GLASS  | 0.90 |
| SLAB TYPE FLOOR:   |  | CONCRETE       |                       | SLF      | 0.68 |
| BASEMENT TYPE:   |  | NONE           |                       | R-BASEM. | 0.00 |
| OVERHEAD DOOR TYPE:  |  | NONE           |                       | R-ODOOR  | 0.00 |
| PERSONNEL DOOR TYPE:   |  | HOLLOW METAL   |                       | R-PDOOR  | 1.81 |

#### III. INFILTRATION:

|                                   |                       |        |    |                          |       |   |     |
|-----------------------------------|-----------------------|--------|----|--------------------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 176 X 0.33 Sq.In./LF= | Sq.In. | 58 | X CFM/Sq.In.             | 1.530 | = | 89  |
| PERSONNEL DOORS (SF)              | 42 X 0.16 Sq.In./SF=  | Sq.In. | 7  | X CFM/Sq.In.             | 1.530 | = | 10  |
|                                   |                       |        |    |                          |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        |    | X CFM / OPENING / HR     | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | 1  | X CFM / OPENING / HR     | 1.385 | = | 1   |
|                                   |                       |        |    | TOTAL INFILTRATION (CFM) |       | = | 101 |

|              |   |             |       |                     |       |   |       |
|--------------|---|-------------|-------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 0     | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 42    | X DOOR "U"          | 0.552 | = | 23    |
| UA WALL      | = | WALL AREA   | 3,780 | X WALL "U"          | 0.265 | = | 1,003 |
| UA ROOF      | = | ROOF AREA   | 6,255 | X ROOF "U"          | 0.111 | = | 696   |
| UA GLASS     | = | GLASS AREA  | 330   | X GLASS "U"         | 1.111 | = | 367   |
| UA SLAB      | = | SLAB PERIM. | 345   | X SLF               | 0.680 | = | 235   |
| UA BASEM.    | = | B-WALL AREA | 0     | X BASE. "U"         | 1.000 | = | 0     |
| INFILTRATION | = | CFM         | 101   | X A. T. F.          | 0.037 | = | 104   |
|              |   |             |       | TOTAL UA (BTU/HR*F) |       | = | 2,427 |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |               |
|----------------------|--------|------------|---------------|
| BLDG NO:             | 7656   | BLDG NAME: | GEN INST BLDG |
| BLDG FUNCTION:       |        |            |               |
| FLOOR AREA: (SQ. FT) | 11,404 | # FLOORS:  | 1             |
| SLAB PERIMETER: (FT) |        |            |               |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL  |
|---|----------|---------|----------------|----------|---------|--------|
| WALLS, GROSS  | (SQ. FT) | 2,514   | 1,716          | 1,716    | 2,514   | 8,459  |
| GLASS   | (SQ. FT) | 431     | 240            | 84       | 455     | 1,210  |
| PERSONNEL DOOR  | (SQ. FT) | 63      | 0              | 42       | 84      | 189    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0      |
| WALLS, NET  | (SQ. FT) | 2,020   | 1,476          | 1,590    | 1,975   | 7,060  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 11,404 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) |         | 189    |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS          | R-VALUE |
|---------------------------------------|--------------|---------------------|---------|
|                                       | 1.           | OUTSIDE AIR FILM    | 0.17    |
|                                       | 2.           | 4" BRICK            | 1.20    |
|                                       | 3.           | 2" AIR SPACE        | 1.00    |
|                                       | 4.           | 1" RIGID INSULATION | 2.78    |
|                                       | 5.           | 8" CMU              | 1.11    |
|                                       | 6.           | 1/2" GYPSUM BOARD   | 0.45    |
|                                       | 7.           | INSIDE AIR FILM     | 0.68    |
|                                       |              | TOTAL R-WALL =      | 7.39    |
|                                       | U=1/R        | 0.135               |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS          | R-VALUE |
|                                       | 1.           | OUTSIDE AIR FILM    | 0.17    |
|                                       | 2.           | BUR                 | 0.33    |
|                                       | 3.           | 3" RIGID INSUL.     | 8.34    |
|                                       | 4.           | AIR SPACE           | 1.00    |
|                                       | 5.           | 1/2" GWB            | 0.45    |
|                                       | 6.           |                     |         |
|                                       | 7.           | INSIDE AIR FILM     | 0.68    |
|                                       |              | TOTAL R-ROOF =      | 10.97   |
|                                       | U=1/R        | 0.091               |         |
| GLASS TYPE:                           | SINGLE PANE  | R-GLASS             | 0.90    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                 | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                          |              |       |   |     |
|-----------------------------------|-----------------------|--------|--------------------------|--------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 216 X 0.33 Sq.In./LF= | Sq.In. | 71                       | X CFM/Sq.In. | 1.530 | = | 109 |
| PERSONNEL DOORS (SF)              | 189 X 0.16 Sq.In./SF= | Sq.In. | 30                       | X CFM/Sq.In. | 1.530 | = | 46  |
|                                   |                       |        |                          |              |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       | 4      | X CFM /OPENING /HR       |              | 1.600 | = | 6   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       | 20     | X CFM /OPENING /HR       |              | 1.385 | = | 28  |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |              |       | = | 189 |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 189    | X DOOR "U"  | 0.552 | = | 104   |
| UA WALL             | = | WALL AREA   | 7,060  | X WALL "U"  | 0.135 | = | 955   |
| UA ROOF             | = | ROOF AREA   | 11,404 | X ROOF "U"  | 0.091 | = | 1,040 |
| UA GLASS            | = | GLASS AREA  | 1,210  | X GLASS "U" | 1.111 | = | 1,344 |
| UA SLAB             | = | SLAB PERIM. | 0      | X SLF       | 0.680 | = | 0     |
| UA BASEM.           | = | B-WALL AREA | 0      | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 189    | X A. T. F.  | 1.037 | = | 196   |
| TOTAL UA (BTU/HR°F) |   |             |        |             |       |   | 3,640 |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |           |            |                  |
|----------------------|-----------|------------|------------------|
| BLDG NO:             | 7739      | BLDG NAME: | FLIGHT SIMULATOR |
| BLDG FUNCTION:       | SIMULATOR |            |                  |
| FLOOR AREA: (SQ. FT) | 4,359     | # FLOORS:  | 1                |
| SLAB PERIMETER: (FT) | 313       |            |                  |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL |
|---|----------|---------|----------------|----------|---------|-------|
| WALLS, GROSS  | (SQ. FT) | 2,014   | 2,243          | 2,181    | 2,048   | 8,485 |
| GLASS   | (SQ. FT) | 0       | 0              | 0        | 72      | 72    |
| PERSONNEL DOOR  | (SQ. FT) | 21      | 63             | 21       | 165     | 270   |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0     |
| WALLS, NET  | (SQ. FT) | 1,993   | 2,180          | 2,160    | 1,811   | 8,143 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 4,359 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) | 270     |       |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPOSITES        | R-VALUE |
|---------------------------------------|--------------|-------------------|---------|
| COMPONENTS:                           |              | 1. NORTH-W WALL   | 8.18    |
| PRE-FINISHED METAL PANELS = 0         |              | 2. NORTH-E WALL   | 7.13    |
| 4" CMU = .72                          |              | 3. SOUTH-W WALL   | 8.18    |
| AIR SPACE = 1.0                       |              | 4. SOUTH-E WALL   | 8.17    |
| 2" RIGID INSULATION = 5.56            |              | 5.                |         |
| 6" CMU = .92                          |              | 6.                |         |
| IA FILM = .68                         |              | 7.                |         |
| OA FILM = .17                         |              | COMP. R-WALL =    | 7.90    |
|                                       |              | U=1/R             | 0.127   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPOSITES        | R-VALUE |
| COMPONENTS:                           |              | 1. HIGH AREA ROOF | 6.67    |
| HIGH AREA ROOF:                       |              | 2. LOW AREA ROOF  | 22.36   |
| BUR = .33                             |              | 3.                |         |
| 2" RIGID INSUL. = 5.56                |              | 4.                |         |
| METAL DECK = 0                        |              | 5.                |         |
| O.A. FILM = .17                       |              | 6.                |         |
| I.A. FILM = .68                       |              | 7.                |         |
| COMPOSITE = 6.67                      |              | COMP R-ROOF =     | 11.70   |
|                                       |              | U=1/R             | 0.085   |
| GLASS TYPE:                           | DOUBLE PANE  | R-GLASS           | 1.75    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF               | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.          | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR           | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR           | 1.81    |

#### III. INFILTRATION:

|                                   |                       |                    |       |              |       |   |    |
|-----------------------------------|-----------------------|--------------------|-------|--------------|-------|---|----|
| WINDOWS (LF of Crack)             | 42 X 0.27 Sq.In./LF=  | Sq.In.             | 11    | X CFM/Sq.In. | 1.530 | = | 17 |
| PERSONNEL DOORS (SF)              | 270 X 0.16 Sq.In./SF= | Sq.In.             | 43    | X CFM/Sq.In. | 1.530 | = | 66 |
| DOOR OPENINGS / HR - SINGLE DOOR  | 4                     | X CFM /OPENING /HR | 1.600 | =            | 6     |   |    |
| DOOR OPENINGS / HR - DOUBLE DOORS | 1                     | X CFM /OPENING /HR | 1.385 | =            | 1     |   |    |
| TOTAL INFILTRATION (CFM)          |                       |                    |       |              |       | = | 91 |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 270   | X DOOR "U"  | 0.552 | = | 149   |
| UA WALL             | = | WALL AREA   | 8,143 | X WALL "U"  | 0.127 | = | 1,031 |
| UA ROOF             | = | ROOF AREA   | 4,359 | X ROOF "U"  | 0.085 | = | 373   |
| UA GLASS            | = | GLASS AREA  | 72    | X GLASS "U" | 0.571 | = | 41    |
| UA SLAB             | = | SLAB PERIM. | 313   | X SLF       | 0.680 | = | 213   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 91    | X A. T. F.  | 1.037 | = | 95    |
| TOTAL UA (BTU/HR*F) |   |             |       |             |       |   | 1,901 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 18-Jul-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                   |
|----------------------|--------|------------|-------------------|
| BLDG NO:             | 7760   | BLDG NAME: | MOTOR REPAIR SHOP |
| BLDG FUNCTION:       |        |            |                   |
| FLOOR AREA: (SQ. FT) | 16,192 | # FLOORS:  | 1                 |
| SLAB PERIMETER: (FT) | 796    |            |                   |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH | EAST  | WEST  | TOTAL  |
|---|----------|-------|-------|-------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 6,096 | 6,096 | 3,456 | 3,456 | 19,104 |
| GLASS   | (SQ. FT) | 16    | 48    | 0     | 16    | 80     |
| PERSONNEL DOOR  | (SQ. FT) | 126   | 252   | 21    | 84    | 483    |
| OVERHEAD DOOR   | (SQ. FT) | 2,160 | 2,160 | 1,800 | 1,800 | 7,920  |
| WALLS, NET  | (SQ. FT) | 3,794 | 3,636 | 1,635 | 1,556 | 10,621 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |       |       |       | 16,192 |
| OVERHEAD DOOR   | (SQ. FT) | 7,920 |       |       |       | 483    |
| BASEMENT WALLS  | (SQ. FT) |       |       |       |       | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|                                       |  |                        |          |      |
|---------------------------------------|--|------------------------|----------|------|
| WALLS: (SKETCH CROSS SECTION OF WALL) |  | COMPONENTS             | R-VALUE  |      |
|                                       |  | 1. OUTSIDE AIR FILM    | 0.17     |      |
|                                       |  | 2. 12" MASONRY UNITS   | 3.70     |      |
|                                       |  | 3. BAY DOORS           | 0.07     |      |
|                                       |  | 4.                     |          |      |
|                                       |  | 5.                     |          |      |
|                                       |  | 6.                     |          |      |
|                                       |  | 7. INSIDE AIR FILM     | 0.68     |      |
|                                       |  | TOTAL R-WALL =         | 4.62     |      |
|                                       |  | U=1/R                  | 0.216    |      |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |  | COMPONENTS             | R-VALUE  |      |
|                                       |  | 1. OUTSIDE AIR FILM    | 0.17     |      |
|                                       |  | 2. BUR                 | 0.33     |      |
|                                       |  | 3. 2" RIGID INSULATION | 5.56     |      |
|                                       |  | 4.                     |          |      |
|                                       |  | 5.                     |          |      |
|                                       |  | 6.                     |          |      |
|                                       |  | 7. INSIDE AIR FILM     | 0.68     |      |
|                                       |  | TOTAL R-ROOF =         | 6.74     |      |
|                                       |  | U=1/R                  | 0.148    |      |
| GLASS TYPE:                           |  | SINGLE PANE            | R-GLASS  | 0.90 |
| SLAB TYPE FLOOR:                      |  | CONCRETE               | SLF      | 0.68 |
| BASEMENT TYPE:                        |  | NONE                   | R-BASEM. | 0.00 |
| OVERHEAD DOOR TYPE:                   |  | NONE                   | R-ODOOR  | 0.00 |
| PERSONNEL DOOR TYPE:                  |  | HOLLOW METAL           | R-PDOOR  | 1.81 |

#### III. INFILTRATION:

|                                   |                       |        |                          |              |       |   |     |
|-----------------------------------|-----------------------|--------|--------------------------|--------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 72 X 0.33 Sq.In./LF=  | Sq.In. | 24                       | X CFM/Sq.In. | 1.530 | = | 36  |
| PERSONNEL DOORS (SF)              | 483 X 0.16 Sq.In./SF= | Sq.In. | 77                       | X CFM/Sq.In. | 1.530 | = | 118 |
|                                   |                       |        |                          |              |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM /OPENING /HR       |              | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | X CFM /OPENING /HR       |              | 1.385 | = | 0   |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |              |       | = | 155 |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 7,920  | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 483    | X DOOR "U"  | 0.552 | = | 267   |
| UA WALL             | = | WALL AREA   | 10,621 | X WALL "U"  | 0.216 | = | 2,299 |
| UA ROOF             | = | ROOF AREA   | 16,192 | X ROOF "U"  | 0.148 | = | 2,402 |
| UA GLASS            | = | GLASS AREA  | 80     | X GLASS "U" | 1.111 | = | 89    |
| UA SLAB             | = | SLAB PERIM. | 796    | X SLF       | 0.680 | = | 541   |
| UA BASEM.           | = | B-WALL AREA | 0      | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 155    | X A. T. F.  | 0.852 | = | 132   |
| TOTAL UA (BTU/HR°F) |   |             |        |             |       |   | 5,730 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                 |
|----------------------|--------|------------|-----------------|
| BLDG NO:             | 7802   | BLDG NAME: | ADM & SUPP BLDG |
| BLDG FUNCTION:       |        |            |                 |
| FLOOR AREA: (SQ. FT) | 12,432 | # FLOORS:  | 1               |
| SLAB PERIMETER: (FT) | 556    |            |                 |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST  | TOTAL  |
|---|----------|-------|----------------|----------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 728   | 728            | 2,886    | 2,886 | 7,228  |
| GLASS   | (SQ. FT) | 0     | 0              | 280      | 448   | 728    |
| PERSONNEL DOOR  | (SQ. FT) | 64    | 0              | 420      | 105   | 589    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0     | 0      |
| WALLS, NET  | (SQ. FT) | 664   | 728            | 2,186    | 2,333 | 5,911  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |       | 12,432 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) | 589   |        |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |       | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| II. CONSTRUCTION: ( { } FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES) |              | COMPONENTS     |                     | R-VALUE |
|--|--------------|----------------|---------------------|---------|
| WALLS: (SKETCH CROSS SECTION OF WALL)                                  |              | 1.             | OUTSIDE AIR FILM    | 0.17    |
|  |              | 2.             | 4" FACE BRICK       | 1.20    |
|  |              | 3.             | 2" AIR SPACE        | 1.00    |
|  |              | 4.             | "6" CMU             | 0.92    |
|  |              | 5.             |                     |         |
|  |              | 6.             |                     |         |
|  |              | 7.             | INSIDE AIR FILM     | 0.68    |
|  |              | TOTAL R-WALL = |                     | 3.97    |
|  |              | U=1/R          |                     | 0.252   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                   |              | COMPONENTS     |                     | R-VALUE |
|  |              | 1.             | OUTSIDE AIR FILM    | 0.17    |
|  |              | 2.             | BUR                 | 0.33    |
|  |              | 3.             | 2" RIGID INSULATION | 5.56    |
|  |              | 4.             | METAL DECK          | 0.00    |
|  |              | 5.             | AIR SPACE           | 1.00    |
|  |              | 6.             | ACOUSTIC TILE       | 1.79    |
|  |              | 7.             | INSIDE AIR FILM     | 0.68    |
|  |              | TOTAL R-ROOF = |                     | 9.46    |
| U=1/R  |              | 0.106          |                     |         |
| GLASS TYPE:  | SINGLE PANE  | R-GLASS        | 0.90                |         |
| SLAB TYPE FLOOR:   | CONCRETE     | SLF            | 0.68                |         |
| BASEMENT TYPE:   | NONE         | R-BASEM.       | 0.00                |         |
| OVERHEAD DOOR TYPE:  | NONE         | R-ODOOR        | 0.00                |         |
| PERSONNEL DOOR TYPE:   | HOLLOW METAL | R-PDOOR        | 1.81                |         |

#### III. INFILTRATION:

|                                   |                       |        |                          |              |       |   |     |
|-----------------------------------|-----------------------|--------|--------------------------|--------------|-------|---|-----|
| iii. INFILTRATION:                |                       |        |                          |              |       |   |     |
| WINDOWS (LF of Crack)             | 390 X 0.33 Sq.In./LF= | Sq.In. | 129                      | X CFM/Sq.In. | 1.530 | = | 197 |
| PERSONNEL DOORS (SF)              | 589 X 0.16 Sq.In./SF= | Sq.In. | 94                       | X CFM/Sq.In. | 1.530 | = | 144 |
|                                   |                       |        |                          |              |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM / OPENING /HR      |              | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | X CFM / OPENING /HR      |              | 1.385 | = | 0   |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |              |       | = | 341 |

|              |   |             |        |                     |       |   |       |
|--------------|---|-------------|--------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 0      | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 589    | X DOOR "U"          | 0.552 | = | 325   |
| UA WALL      | = | WALL AREA   | 5,911  | X WALL "U"          | 0.252 | = | 1,489 |
| UA ROOF      | = | ROOF AREA   | 12,432 | X ROOF "U"          | 0.106 | = | 1,314 |
| UA GLASS     | = | GLASS AREA  | 728    | X GLASS "U"         | 1.111 | = | 809   |
| UA SLAB      | = | SLAB PERIM. | 556    | X SLF               | 0.680 | = | 378   |
| UA BASEM.    | = | B-WALL AREA | 0      | X BASE. "U"         | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 341    | X A. T. F.          | 1.037 | = | 354   |
|              |   |             |        | TOTAL UA (BTU/HR°F) |       |   | 4,669 |

E M C ENGINEERS, INC  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406 001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |                 |
|----------------------|-------|------------|-----------------|
| BLDG NO:             | 7820  | BLDG NAME: | BN ADMIN & CLRM |
| BLDG FUNCTION:       |       |            |                 |
| FLOOR AREA: (SQ. FT) | 6,655 | # FLOORS:  | 1               |
| SLAB PERIMETER: (FT) | 356   |            |                 |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL |
|---|----------|---------|----------------|----------|---------|-------|
| WALLS, GROSS  | (SQ. FT) | 936     | 1,200          | 1,200    | 936     | 4,272 |
| GLASS   | (SQ. FT) | 90      | 0              | 120      | 120     | 330   |
| PERSONNEL DOOR  | (SQ. FT) | 42      | 0              | 0        | 0       | 42    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0     |
| WALLS, NET  | (SQ. FT) | 804     | 1,200          | 1,080    | 816     | 3,900 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 6,655 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) |         | 42    |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|                                       |              |                          |         |
|---------------------------------------|--------------|--------------------------|---------|
| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS               | R-VALUE |
|                                       |              | 1. OUTSIDE AIR FILM      | 0.17    |
|                                       |              | 2. 4" BRICK              | 1.20    |
|                                       |              | 3. 2" AIR SPACE          | 1.00    |
|                                       |              | 4. 4" CMU                | 0.72    |
|                                       |              | 5.                       |         |
|                                       |              | 6.                       |         |
|                                       |              | 7. INSIDE AIR FILM       | 0.68    |
|                                       |              | TOTAL R-WALL =           | 3.77    |
|                                       |              | U=1/R                    | 0.265   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS               | R-VALUE |
|                                       |              | 1. OUTSIDE AIR FILM      | 0.17    |
|                                       |              | 2. BUR                   | 0.33    |
|                                       |              | 3. 2" RIGID INSUL        | 5.56    |
|                                       |              | 4. AIR SPACE             | 1.00    |
|                                       |              | 5. ACOUSTIC TILE CEILING | 1.25    |
|                                       |              | 6.                       |         |
|                                       |              | 7. INSIDE AIR FILM       | 0.68    |
|                                       |              | TOTAL R-ROOF =           | 8.99    |
|                                       |              | U=1/R                    | 0.111   |
| GLASS TYPE:                           | SINGLE PANE  | R-GLASS                  | 0.90    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                      | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.                 | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR                  | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR                  | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                          |                    |       |       |     |   |
|-----------------------------------|-----------------------|--------|--------------------------|--------------------|-------|-------|-----|---|
| WINDOWS (LF of Crack)             | 176 X 0.33 Sq.In./LF= | Sq.In. | 58                       | X CFM/Sq.In.       | 1.530 | =     | 89  |   |
| PERSONNEL DOORS (SF)              | 42 X 0.16 Sq.In./SF=  | Sq.In. | 7                        | X CFM/Sq.In.       | 1.530 | =     | 10  |   |
|                                   |                       |        |                          |                    |       |       |     |   |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM /OPENING /HR       |                    | 1.600 | =     | 0   |   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | 2                        | X CFM /OPENING /HR |       | 1.385 | =   | 3 |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |                    |       | =     | 102 |   |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 42    | X DOOR "U"  | 0.552 | = | 23    |
| UA WALL             | = | WALL AREA   | 3,900 | X WALL "U"  | 0.265 | = | 1,034 |
| UA ROOF             | = | ROOF AREA   | 6,655 | X ROOF "U"  | 0.111 | = | 740   |
| UA GLASS            | = | GLASS AREA  | 330   | X GLASS "U" | 1.111 | = | 367   |
| UA SLAB             | = | SLAB PERIM. | 356   | X SLF       | 0.680 | = | 242   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 102   | X A. T. F.  | 1.037 | = | 106   |
| TOTAL UA (BTU/HR°F) |   |             |       |             |       |   | 2,512 |

E M C ENGINEERS, INC.  
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 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |                    |
|----------------------|-------|------------|--------------------|
| BLDG NO:             | 7834  | BLDG NAME: | REGEENTAL HQ BLDG. |
| BLDG FUNCTION:       |       |            |                    |
| FLOOR AREA: (SQ. FT) | 9,843 | # FLOORS:  | 3                  |
| SLAB PERIMETER: (FT) |       |            |                    |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL |
|---|----------|---------|----------------|----------|---------|-------|
| WALLS, GROSS  | (SQ. FT) | 1,220   | 2,420          | 2,420    | 1,220   | 7,280 |
| GLASS   | (SQ. FT) | 336     | 632            | 504      | 336     | 1,808 |
| PERSONNEL DOOR  | (SQ. FT) | 0       | 42             | 42       | 0       | 84    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0     |
| WALLS, NET  | (SQ. FT) | 884     | 1,746          | 1,874    | 884     | 5,388 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         |       |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) |         | 84    |
| BASEMENT WALLS  | (SQ. FT) | 102     | 202            | 202      | 102     | 607   |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|   |              |                        |         |
|---|--------------|------------------------|---------|
| II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES) |              |                        |         |
| WALLS: (SKETCH CROSS SECTION OF WALL)                                 |              | COMPONENTS             | R-VALUE |
|   |              | 1. OUTSIDE AIR FILM    | 0.17    |
|   |              | 2. 6" BRICK            | 1.80    |
|   |              | 3. 2" AIR SPACE        | 1.00    |
|   |              | 4. 8"CMU               | 1.11    |
|   |              | 5. 1/2" GYPSUM BD.     | 0.45    |
|   |              | 6.                     |         |
|   |              | 7. INSIDE AIR FILM     | 0.68    |
|   |              | TOTAL R-WALL =         | 5.21    |
|   |              | U=1/R                  | 0.192   |
|   |              |                        |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                                  |              | COMPONENTS             | R-VALUE |
|   |              | 1. OUTSIDE AIR FILM    | 0.17    |
|   |              | 2. BUR                 | 0.33    |
|   |              | 3. WOOD DECK           | 0.83    |
|   |              | 4. AIR SPACE           | 1.00    |
|   |              | 5. 2" RIGID INSULATION | 5.56    |
|   |              | 6.                     |         |
|   |              | 7. INSIDE AIR FILM     | 0.68    |
|   |              | TOTAL R-ROOF =         | 8.57    |
|   |              | U=1/R                  | 0.117   |
|   |              |                        |         |
| GLASS TYPE:   | SINGLE PANE  | R-GLASS                | 0.90    |
| SLAB TYPE FLOOR:  | CONCRETE     | SLF                    | 0.68    |
| BASEMENT TYPE:  | NONE         | R-BASEM.               | 0.00    |
| OVERHEAD DOOR TYPE:   | NONE         | R-ODOOR                | 0.00    |
| PERSONNEL DOOR TYPE:  | HOLLOW METAL | R-PDOOR                | 1.81    |

#### III. INFILTRATION:

|                                   |                        |        |                      |                          |       |   |     |
|-----------------------------------|------------------------|--------|----------------------|--------------------------|-------|---|-----|
| iii. INFILTRATION:                |                        |        |                      |                          |       |   |     |
| WINDOWS (LF of Crack)             | 1712 X 0.33 Sq.in./LF= | Sq.in. | 565                  | X CFM/Sq.in.             | 1.530 | = | 864 |
| PERSONNEL DOORS (SF)              | 84 X 0.16 Sq.in./SF=   | Sq.in. | 13                   | X CFM/Sq.in.             | 1.530 | = | 21  |
|                                   |                        |        |                      |                          |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                        |        | X CFM / OPENING / HR |                          | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                        |        | X CFM / OPENING / HR |                          | 1.385 | = | 0   |
|                                   |                        |        |                      | TOTAL INFILTRATION (CFM) |       | = | 885 |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 84    | X DOOR "U"  | 0.552 | = | 46    |
| UA WALL             | = | WALL AREA   | 5,388 | X WALL "U"  | 0.192 | = | 1,034 |
| UA ROOF             | = | ROOF AREA   | 0     | X ROOF "U"  | 0.117 | = | 0     |
| UA GLASS            | = | GLASS AREA  | 1,808 | X GLASS "U" | 1.111 | = | 2,009 |
| UA SLAB             | = | SLAB PERIM. | 0     | X SLF       | 0.680 | = | 0     |
| UA BASEM.           | = | B-WALL AREA | 607   | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 885   | X A. T. F.  | 1.037 | = | 918   |
| TOTAL UA (BTU/HR°F) |   |             |       |             |       |   | 4,007 |



E M C ENGINEERS, INC.  
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 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |             |
|----------------------|--------|------------|-------------|
| BLDG NO:             | 7865   | BLDG NAME: | UNIT CHAPEL |
| BLDG FUNCTION:       | CHAPEL |            |             |
| FLOOR AREA: (SQ. FT) | 6,642  | # FLOORS:  | 1           |
| SLAB PERIMETER: (FT) | 421    |            |             |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-E | NORTH-W        | SOUTH-E | SOUTH-W  | TOTAL          |
|---|----------|---------|----------------|---------|----------|----------------|
| WALLS, GROSS  | (SQ. FT) | 1,690   | 1,090          | 1,263   | 1,690    | 5,734          |
| GLASS   | (SQ. FT) | 326     | 39             | 0       | 117      | 482            |
| PERSONNEL DOOR  | (SQ. FT) | 42      | 84             | 0       | 21       | 147            |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0       | 0        | 0              |
| WALLS, NET  | (SQ. FT) | 1,322   | 967            | 1,263   | 1,552    | 5,105          |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) |          |         |                |         |          | (SQ. FT) 6,888 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR |         | (SQ. FT) | 147            |
| BASEMENT WALLS  | (SQ. FT) |         |                |         |          | 0              |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) | COMPONENTS             | R-VALUE       |
|---------------------------------------|------------------------|---------------|
|                                       | 1. OUTSIDE AIR FILM    | 0.17          |
|                                       | 2. 4" BRICK            | 1.20          |
|                                       | 3. AIR SPACE           | 1.00          |
|                                       | 4. 8" CMU              | 1.11          |
|                                       | 5.                     |               |
|                                       | 6.                     |               |
|                                       | 7. INSIDE AIR FILM     | 0.68          |
|                                       | TOTAL R-WALL =         | 4.16          |
|                                       | U=1/R                  | 0.240         |
|                                       |                        |               |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  | COMPONENTS             | R-VALUE       |
|                                       | 1. OUTSIDE AIR FILM    | 0.17          |
|                                       | 2. 2.5" BUR            | 0.33          |
|                                       | 3. 4" RIGID INSUL.     | 11.12         |
|                                       | 4. 2" ROOF DECK (WOOD) | 2.20          |
|                                       | 5.                     |               |
|                                       | 6.                     |               |
|                                       | 7. INSIDE AIR FILM     | 0.68          |
|                                       | TOTAL R-ROOF =         | 14.50         |
|                                       | U=1/R                  | 0.069         |
|                                       |                        |               |
| GLASS TYPE:                           | SINGLE PANE W/STORMS   | R-GLASS 1.60  |
| SLAB TYPE FLOOR:                      | CONCRETE               | SLF 0.68      |
| BASEMENT TYPE:                        | NONE                   | R-BASEM. 0.00 |
| OVERHEAD DOOR TYPE:                   | NONE                   | R-ODOOR 0.00  |
| PERSONNEL DOOR TYPE:                  | WOOD                   | R-PDOOR 1.88  |

#### III. INFILTRATION:

|                                   |                       |                      |       |                          |       |     |     |
|-----------------------------------|-----------------------|----------------------|-------|--------------------------|-------|-----|-----|
| WINDOWS (LF of Crack)             | 269 X 0.27 Sq.In./LF= | Sq.In.               | 73    | X CFM/Sq.In.             | 1.530 | =   | 111 |
| PERSONNEL DOORS (SF)              | 147 X 0.16 Sq.In./SF= | Sq.In.               | 24    | X CFM/Sq.In.             | 1.530 | =   | 36  |
|                                   |                       |                      |       |                          |       |     |     |
| DOOR OPENINGS / HR - SINGLE DOOR  | 1                     | X CFM / OPENING / HR | 1.600 | =                        | 2     |     |     |
| DOOR OPENINGS / HR - DOUBLE DOORS | 3                     | X CFM / OPENING / HR | 1.385 | =                        | 4     |     |     |
|                                   |                       |                      |       | TOTAL INFILTRATION (CFM) | =     | 153 |     |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 147   | X DOOR "U"  | 0.532 | = | 78    |
| UA WALL             | = | WALL AREA   | 5,105 | X WALL "U"  | 0.240 | = | 1,227 |
| UA ROOF             | = | ROOF AREA   | 6,888 | X ROOF "U"  | 0.069 | = | 475   |
| UA GLASS            | = | GLASS AREA  | 482   | X GLASS "U" | 0.625 | = | 301   |
| UA SLAB             | = | SLAB PERIM. | 421   | X SLF       | 0.680 | = | 286   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 153   | X A. T. F.  | 1.037 | = | 159   |
| TOTAL UA (BTU/HR°F) |   |             |       |             |       |   | 2,526 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |         |            |                |
|----------------------|---------|------------|----------------|
| BLDG NO:             | 7920    | BLDG NAME: | VEH MAINT SHOP |
| BLDG FUNCTION:       | MAINT   |            |                |
| FLOOR AREA: (SQ. FT) | 124,553 | # FLOORS:  | 1              |
| SLAB PERIMETER: (FT) | 3,057   |            |                |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

| I. AREAS: ( [ ] FIELD VERIFIED ELEVATION PLANS)       |          | NORTH  | SOUTH          | EAST   | WEST     | TOTAL   |
|---|----------|--------|----------------|--------|----------|---------|
| WALLS, GROSS  | (SQ. FT) | 17,578 | 17,578         | 17,578 | 17,578   | 70,312  |
| GLASS   | (SQ. FT) | 49     | 25             | 25     | 25       | 123     |
| PERSONNEL DOOR  | (SQ. FT) | 84     | 84             | 63     | 63       | 294     |
| OVERHEAD DOOR   | (SQ. FT) | 9,216  | 4,608          | 4,608  | 4,608    | 23,040  |
| WALLS, NET  | (SQ. FT) | 8,229  | 12,862         | 12,883 | 12,883   | 46,856  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) |          |        |                |        | (SQ. FT) | 124,553 |
| OVERHEAD DOOR   | (SQ. FT) | 23,040 | PERSONNEL DOOR |        | (SQ. FT) | 294     |
| BASEMENT WALLS  | (SQ. FT) |        |                |        |          | 0       |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| II. CONSTRUCTION: ( [ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)   |              | COMPONENTS          | R-VALUE |
|--|--------------|---------------------|---------|
| WALLS: (SKETCH CROSS SECTION OF WALL)<br><br>COMPOSITE:<br>12" CONCRETE = 3.7<br>INSULATED METAL PANELS = 7.33<br>O'HEAD INSULATED METAL DOORS = 7.33<br>COMPOSITE = 4.8 | 1.           | OUTSIDE AIR FILM    | 0.17    |
|  | 2.           | COMPOSITE           | 4.80    |
|  | 3.           |                     |         |
|  | 4.           |                     |         |
|  | 5.           |                     |         |
|  | 6.           |                     |         |
|  | 7.           | INSIDE AIR FILM     | 0.68    |
|  |              | TOTAL R-WALL =      | 5.65    |
|  |              | U=1/R               | 0.177   |
|  |              |                     |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)   |              | COMPONENTS          | R-VALUE |
|  | 1.           | OUTSIDE AIR FILM    | 0.17    |
|  | 2.           | BUR                 | 0.33    |
|  | 3.           | STEEL DECK          | 0.00    |
|  | 4.           | 2" RIGID INSULATION | 5.56    |
|  | 5.           |                     |         |
|  | 6.           |                     |         |
|  | 7.           | INSIDE AIR FILM     | 0.68    |
|  |              | TOTAL R-ROOF =      | 6.74    |
|  |              | U=1/R               | 0.148   |
|  |              |                     |         |
| GLASS TYPE:  | SINGLE PANE  | R-GLASS             | 0.90    |
| SLAB TYPE FLOOR:   | CONCRETE     | SLF                 | 0.68    |
| BASEMENT TYPE:   | NONE         | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE:  | NONE         | R-ODOOR             | 7.33    |
| PERSONNEL DOOR TYPE:   | HOLLOW METAL | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                     |              |       |    |       |
|-----------------------------------|-----------------------|--------|---------------------|--------------|-------|----|-------|
| III. INFILTRATION:                |                       |        |                     |              |       |    |       |
| WINDOWS (LF of Crack)             | 105 X 0.33 Sq.In./LF= | Sq.In. | 35                  | X CFM/Sq.In. | 1.530 | =  | 53    |
| PERSONNEL DOORS (SF)              | 294 X 0.16 Sq.In./SF= | Sq.In. | 47                  | X CFM/Sq.In. | 1.530 | =  | 72    |
| OVERHEAD DOORS (SF)               |                       |        | 23040               | X CFM/Sq.Ft. | 0.456 | =  | 10506 |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       | 10     | X CFM / OPENING /HR | 1.600        | =     | 16 |       |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       | 10     | X CFM / OPENING /HR | 1.385        | =     | 14 |       |
| TOTAL INFILTRATION (CFM)          |                       |        |                     |              |       | =  | 10661 |

|                     |   |             |         |             |       |   |        |
|---------------------|---|-------------|---------|-------------|-------|---|--------|
| UA ODOOR            | = | ODOOR AREA  | 23,040  | X DOOR "U"  | 0.136 | = | 3,143  |
| UA PDOOR            | = | PDOOR AREA  | 294     | X DOOR "U"  | 0.552 | = | 162    |
| UA WALL             | = | WALL AREA   | 46,856  | X WALL "U"  | 0.177 | = | 8,293  |
| UA ROOF             | = | ROOF AREA   | 124,553 | X ROOF "U"  | 0.148 | = | 18,480 |
| UA GLASS            | = | GLASS AREA  | 123     | X GLASS "U" | 1.111 | = | 136    |
| UA SLAB             | = | SLAB PERIM. | 3,057   | X SLF       | 0.680 | = | 2,079  |
| UA BASEM.           | = | B-WALL AREA | 0       | X BASE. "U" | 0.000 | = | 0      |
| INFILTRATION        | = | CFM         | 10661   | X A. T. F.  | 1.037 | = | 11,056 |
| TOTAL UA (BTU/HR°F) |   |             |         |             |       |   | 43,349 |

E M C ENGINEERS, INC.  
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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                  |
|----------------------|--------|------------|------------------|
| BLDG NO:             | 7940   | BLDG NAME: | VEH MNT SHOP ORG |
| BLDG FUNCTION:       |        |            |                  |
| FLOOR AREA: (SQ. FT) | 22,345 | # FLOORS:  | 1                |
| SLAB PERIMETER: (FT) | 994    |            |                  |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH  | SOUTH          | EAST  | WEST     | TOTAL  |
|---|----------|--------|----------------|-------|----------|--------|
| WALLS, GROSS  | (SQ. FT) | 7,865  | 7,865          | 6,696 | 6,696    | 29,121 |
| GLASS   | (SQ. FT) | 112    | 96             | 720   | 440      | 1,368  |
| PERSONNEL DOOR  | (SQ. FT) | 84     | 21             | 189   | 270      | 564    |
| OVERHEAD DOOR   | (SQ. FT) | 3,080  | 3,080          | 2,080 | 2,080    | 10,320 |
| WALLS, NET  | (SQ. FT) | 4,589  | 4,668          | 3,707 | 3,906    | 16,869 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |        |                |       |          | 20,345 |
| OVERHEAD DOOR   | (SQ. FT) | 10,320 | PERSONNEL DOOR |       | (SQ. FT) | 564    |
| BASEMENT WALLS  | (SQ. FT) |        |                |       |          | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|                                       |                     |         |
|---------------------------------------|---------------------|---------|
| WALLS: (SKETCH CROSS SECTION OF WALL) | COMPONENTS          | R-VALUE |
| COMPONENTS:                           | 1. N WALL           | 3.09    |
| 12" MASONRY UNITS = 3.7               | 2. S WALL           | 3.09    |
| INSULATED METAL PANELS = 7.33         | 3. E WALL           | 6.22    |
| BAY DOORS = .07                       | 4. W WALL           | 7.10    |
| OA FILM = .17                         | 5.                  |         |
| IA FILM = .68                         | 6.                  |         |
|                                       | 7. INSIDE AIR FILM  | 0.68    |
|                                       | TOTAL R-WALL =      | 20.18   |
|                                       | U=1/R               | 0.050   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  | COMPONENTS          | R-VALUE |
|                                       | 1. OUTSIDE AIR FILM | 0.17    |
|                                       | 2. 5 PLY BUR        | 0.33    |
|                                       | 3. 2" RIGID INSUL   | 5.56    |
|                                       | 4.                  |         |
|                                       | 5.                  |         |
|                                       | 6.                  |         |
|                                       | 7. INSIDE AIR FILM  | 0.68    |
|                                       | TOTAL R-ROOF =      | 6.74    |
|                                       | U=1/R               | 0.148   |
| GLASS TYPE: SINGLE PANE               | R-GLASS             | 0.90    |
| SLAB TYPE FLOOR: CONCRETE             | SLF                 | 0.68    |
| BASEMENT TYPE: NONE                   | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE: INSULATED METAL   | R-ODOOR             | 7.33    |
| PERSONNEL DOOR TYPE: HOLLOW METAL     | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |       |                          |       |   |      |
|-----------------------------------|-----------------------|--------|-------|--------------------------|-------|---|------|
| WINDOWS (LF of Crack)             | 908 X 0.33 Sq.In./LF= | Sq.In. | 300   | X CFM/Sq.In.             | 1.530 | = | 458  |
| PERSONNEL DOORS (SF)              | 564 X 0.16 Sq.In./SF= | Sq.In. | 90    | X CFM/Sq.In.             | 1.530 | = | 138  |
| OVERHEAD DOORS (SF)               |                       |        | 10320 | X CFM/Sq.Ft.             | 0.114 | = | 1176 |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        |       | X CFM /OPENING /HR       | 1.600 | = | 0    |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        |       | X CFM /OPENING /HR       | 1.385 | = | 0    |
|                                   |                       |        |       | TOTAL INFILTRATION (CFM) |       | = | 1773 |

|              |   |             |        |                     |       |   |       |
|--------------|---|-------------|--------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 10,320 | X DOOR "U"          | 0.136 | = | 1,408 |
| UA PDOOR     | = | PDOOR AREA  | 564    | X DOOR "U"          | 0.552 | = | 312   |
| UA WALL      | = | WALL AREA   | 16,869 | X WALL "U"          | 0.050 | = | 836   |
| UA ROOF      | = | ROOF AREA   | 20,345 | X ROOF "U"          | 0.148 | = | 3,019 |
| UA GLASS     | = | GLASS AREA  | 1,368  | X GLASS "U"         | 1.111 | = | 1,520 |
| UA SLAB      | = | SLAB PERIM. | 994    | X SLF               | 0.680 | = | 676   |
| UA BASEM.    | = | B-WALL AREA | 0      | X BASE "U"          | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 1773   | X A. T. F.          | 1.037 | = | 1,839 |
|              |   |             |        | TOTAL UA (BTU/HR°F) |       | = | 9,609 |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |          |            |                      |
|----------------------|----------|------------|----------------------|
| BLDG NO:             | 8002     | BLDG NAME: | ENL BARRACKS W/O DIN |
| BLDG FUNCTION:       | BARRACKS |            |                      |
| FLOOR AREA: (SQ. FT) | 20,349   | # FLOORS:  | 3                    |
| SLAB PERIMETER: (FT) | 634      |            |                      |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL  |
|---|----------|---------|----------------|----------|---------|--------|
| WALLS, GROSS  | (SQ. FT) | 5,306   | 4,491          | 4,491    | 5,306   | 19,594 |
| GLASS   | (SQ. FT) | 936     | 0              | 0        | 744     | 1,680  |
| PERSONNEL DOOR  | (SQ. FT) | 0       | 126            | 126      | 28      | 280    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0      |
| WALLS, NET  | (SQ. FT) | 4,370   | 4,365          | 4,365    | 4,534   | 17,634 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 6,783  |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) |         | 280    |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)                        |              |                     |         |
|--|--------------|---------------------|---------|
| WALLS: (SKETCH CROSS SECTION OF WALL)  |              | COMPONENTS          | R-VALUE |
| *COMPOSITE= JUMBO BRICK - 1.8<br>1/4" ASBESTOS CEMENT - .034<br>PRE-FAB FASCIA PANELS - 1.17 | 1.           | OUTSIDE AIR FILM    | 0.17    |
|  | 2.           | COMPOSITE*          | 1.50    |
|  | 3.           | 2" RIGID INSULATION | 5.56    |
|  | 4.           | 1" AIR SPACE        | 1.00    |
|  | 5.           | 6" CMU              | 0.92    |
|  | 6.           |                     |         |
|  | 7.           | INSIDE AIR FILM     | 0.68    |
|  |              | TOTAL R-WALL =      | 9.83    |
|  |              | U=1/R               | 0.102   |
|  |              |                     |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)   |              | COMPONENTS          | R-VALUE |
|  | 1.           | OUTSIDE AIR FILM    | 0.17    |
|  | 2.           | BUILT UP ROOF       | 0.33    |
|  | 3.           | 3" RIGID INSULATION | 8.34    |
|  | 4.           | 2.5" CONCRETE DECK  | 0.21    |
|  | 5.           |                     |         |
|  | 6.           |                     |         |
|  | 7.           | INSIDE AIR FILM     | 0.68    |
|  |              | TOTAL R-ROOF =      | 9.73    |
|  |              | U=1/R               | 0.103   |
|  |              |                     |         |
| GLASS TYPE:  | SINGLE PANE  | R-GLASS             | 0.90    |
| SLAB TYPE FLOOR:   | CONCRETE     | SLF                 | 0.68    |
| BASEMENT TYPE:   | NONE         | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE:  | NONE         | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE:   | HOLLOW METAL | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                        |        |                          |              |       |   |     |
|-----------------------------------|------------------------|--------|--------------------------|--------------|-------|---|-----|
| iii. INFILTRATION.                |                        |        |                          |              |       |   |     |
| WINDOWS (LF of Crack)             | 1416 X 0.33 Sq.In./LF= | Sq.In. | 467                      | X CFM/Sq.In. | 1.530 | = | 715 |
| PERSONNEL DOORS (SF)              | 280 X 0.16 Sq.In./SF=  | Sq.In. | 45                       | X CFM/Sq.In. | 1.530 | = | 69  |
|                                   |                        |        |                          |              |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                        | 12     | X CFM /OPENING /HR       | 1.600        | =     |   | 19  |
| DOOR OPENINGS / HR - DOUBLE DOORS |                        |        | X CFM /OPENING /HR       | 1.385        | =     |   | 0   |
|                                   |                        |        | TOTAL INFILTRATION (CFM) |              | =     |   | 803 |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 280    | X DOOR "U"  | 0.552 | = | 155   |
| UA WALL             | = | WALL AREA   | 17,634 | X WALL "U"  | 0.102 | = | 1,795 |
| UA ROOF             | = | ROOF AREA   | 6,783  | X ROOF "U"  | 0.103 | = | 697   |
| UA GLASS            | = | GLASS AREA  | 1,680  | X GLASS "U" | 1.111 | = | 1,867 |
| UA SLAB             | = | SLAB PERIM. | 634    | X SLF       | 0.680 | = | 431   |
| UA BASEM.           | = | B-WALL AREA | 0      | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 803    | X A. T. F.  | 1.037 | = | 832   |
| TOTAL UA (BTU/HR°F) |   |             |        |             |       |   | 5,777 |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |          |            |                      |
|----------------------|----------|------------|----------------------|
| BLDG NO:             | 8008     | BLDG NAME: | ENL BARRACKS W/O DIN |
| BLDG FUNCTION:       | BARRACKS |            |                      |
| FLOOR AREA: (SQ. FT) | 10,174   | # FLOORS:  | 3                    |
| SLAB PERIMETER: (FT) | 317      |            |                      |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL |
|---|----------|---------|----------------|----------|---------|-------|
| WALLS, GROSS  | (SQ. FT) | 2,653   | 2,249          | 2,246    | 2,653   | 9,800 |
| GLASS   | (SQ. FT) | 468     | 0              | 0        | 372     | 840   |
| PERSONNEL DOOR  | (SQ. FT) | 0       | 63             | 63       | 28      | 154   |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0     |
| WALLS, NET  | (SQ. FT) | 2,185   | 2,186          | 2,183    | 2,253   | 8,806 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 3,391 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) |         | 154   |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL)  |              | COMPONENTS          | R-VALUE |
|--|--------------|---------------------|---------|
| *COMPOSITE= JUMBO BRICK - 1.8<br>1/4" ASBESTOS CEMENT - .034<br>PRE-FAB FASCIA PANELS - 1.17 | 1.           | OUTSIDE AIR FILM    | 0.17    |
|  | 2.           | COMPOSITE*          | 1.50    |
|  | 3.           | 2" RIGID INSULATION | 5.56    |
|  | 4.           | 1" AIR SPACE        | 1.00    |
|  | 5.           | 6" CMU              | 0.92    |
|  | 6.           |                     |         |
|  | 7.           | INSIDE AIR FILM     | 0.68    |
|  |              | TOTAL R-WALL =      | 9.83    |
|  | U=1/R        | 0.102               |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)   |              | COMPONENTS          | R-VALUE |
|  | 1.           | OUTSIDE AIR FILM    | 0.17    |
|  | 2.           | BUILT UP ROOF       | 0.33    |
|  | 3.           | 3" RIGID INSULATION | 8.34    |
|  | 4.           | 2.5" CONCRETE DECK  | 0.21    |
|  | 5.           |                     |         |
|  | 6.           |                     |         |
|  | 7.           | INSIDE AIR FILM     | 0.68    |
|  |              | TOTAL R-ROOF =      | 9.73    |
|  | U=1/R        | 0.103               |         |
| GLASS TYPE:  | SINGLE PANE  | R-GLASS             | 0.90    |
| SLAB TYPE FLOOR:   | CONCRETE     | SLF                 | 0.68    |
| BASEMENT TYPE:   | NONE         | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE:  | NONE         | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE:   | HOLLOW METAL | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                       |                    |       |                          |       |   |     |
|-----------------------------------|-----------------------|--------------------|-------|--------------------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 708 X 0.33 Sq.In./LF= | Sq.In.             | 234   | X CFM/Sq.In.             | 1.530 | = | 357 |
| PERSONNEL DOORS (SF)              | 154 X 0.16 Sq.In./SF= | Sq.In.             | 25    | X CFM/Sq.In.             | 1.530 | = | 38  |
| DOOR OPENINGS / HR - SINGLE DOOR  | 6                     | X CFM /OPENING /HR | 1.600 | =                        | 10    |   |     |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       | X CFM /OPENING /HR | 1.385 | =                        | 0     |   |     |
|                                   |                       |                    |       | TOTAL INFILTRATION (CFM) |       | = | 405 |

|              |   |             |       |                     |       |   |       |
|--------------|---|-------------|-------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 0     | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 154   | X DOOR "U"          | 0.552 | = | 85    |
| UA WALL      | = | WALL AREA   | 8,806 | X WALL "U"          | 0.102 | = | 896   |
| UA ROOF      | = | ROOF AREA   | 3,391 | X ROOF "U"          | 0.103 | = | 349   |
| UA GLASS     | = | GLASS AREA  | 840   | X GLASS "U"         | 1.111 | = | 933   |
| UA SLAB      | = | SLAB PERIM. | 317   | X SLF               | 0.680 | = | 216   |
| UA BASEM.    | = | B-WALL AREA | 0     | X BASE. "U"         | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 405   | X A. T. F.          | 1.037 | = | 420   |
|              |   |             |       | TOTAL UA (BTU/HR°F) |       |   | 2,899 |

E M C ENGINEERS, INC.  
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 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |              |
|----------------------|-------|------------|--------------|
| BLDG NO:             | 8010  | BLDG NAME: | DET DAY ROOM |
| BLDG FUNCTION:       | ADMIN |            |              |
| FLOOR AREA: (SQ. FT) | 2,070 | # FLOORS:  | 1            |
| SLAB PERIMETER: (FT) | 157   |            |              |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

| 1. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)        |          | NORTH-E | NORTH-W        | SOUTH-E | SOUTH-W  | TOTAL |
|---|----------|---------|----------------|---------|----------|-------|
| WALLS, GROSS  | (SQ. FT) | 575     | 460            | 575     | 427      | 2,038 |
| GLASS   | (SQ. FT) | 62      | 0              | 56      | 62       | 181   |
| PERSONNEL DOOR  | (SQ. FT) | 21      | 0              | 0       | 21       | 42    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0       | 0        | 0     |
| WALLS, NET  | (SQ. FT) | 492     | 460            | 519     | 344      | 1,815 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) |          |         |                |         | (SQ. FT) | 2,070 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR |         | (SQ. FT) | 42    |
| BASEMENT WALLS  | (SQ. FT) |         |                |         |          | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

II. CONSTRUCTION: ( [ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS          | R-VALUE |
|---------------------------------------|--------------|---------------------|---------|
|                                       |              | 1. OUTSIDE AIR FILM | 0.17    |
|                                       |              | 2. 6" JUMBO BRICK   | 1.80    |
|                                       |              | 3. 2" RIGID INSUL.  | 5.56    |
|                                       |              | 4. AIR SPACE        | 1.00    |
|                                       |              | 5. 6" FILLED CMU    | 3.00    |
|                                       |              | 6.                  |         |
|                                       |              | 7. INSIDE AIR FILM  | 0.68    |
|                                       |              | TOTAL R-WALL =      | 12.21   |
|                                       |              | U=1/R               | 0.082   |
|                                       |              |                     |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS          | R-VALUE |
|                                       |              | 1. OUTSIDE AIR FILM | 0.17    |
|                                       |              | 2. BUR              | 0.33    |
|                                       |              | 3. 3" RIGID INSUL.  | 8.34    |
|                                       |              | 4. AIR SPACE        | 1.00    |
|                                       |              | 5. ACOUSTIC TILE    | 1.79    |
|                                       |              | 6.                  |         |
|                                       |              | 7. INSIDE AIR FILM  | 0.68    |
|                                       |              | TOTAL R-ROOF =      | 12.31   |
|                                       |              | U=1/R               | 0.081   |
|                                       |              |                     |         |
| GLASS TYPE:                           | DOUBLE PANE  | R-GLASS             | 1.75    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                 | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |    |                      |       |   |     |
|-----------------------------------|-----------------------|--------|----|----------------------|-------|---|-----|
| III. INFILTRATION:                |                       |        |    |                      |       |   |     |
| WINDOWS (LF of Crack)             | 181 X 0.27 Sq.In./LF= | Sq.In. | 49 | X CFM/Sq.In.         | 1.530 | = | 75  |
| PERSONNEL DOORS (SF)              | 42 X 0.16 Sq.In./SF=  | Sq.In. | 7  | X CFM/Sq.In.         | 1.530 | = | 10  |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | 16 | X CFM / OPENING / HR | 1.600 | = | 26  |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        |    | X CFM / OPENING / HR | 1.385 | = | 0   |
| TOTAL INFILTRATION (CFM)          |                       |        |    |                      |       | = | 111 |

|                     |   |             |       |             |       |   |     |
|---------------------|---|-------------|-------|-------------|-------|---|-----|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0   |
| UA PDOOR            | = | PDOOR AREA  | 42    | X DOOR "U"  | 0.552 | = | 23  |
| UA WALL             | = | WALL AREA   | 1,815 | X WALL "U"  | 0.082 | = | 149 |
| UA ROOF             | = | ROOF AREA   | 2,070 | X ROOF "U"  | 0.081 | = | 168 |
| UA GLASS            | = | GLASS AREA  | 181   | X GLASS "U" | 0.571 | = | 103 |
| UA SLAB             | = | SLAB PERIM. | 157   | X SLF       | 0.680 | = | 107 |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE "U"  | 0.000 | = | 0   |
| INFILTRATION        | = | CFM         | 111   | X A. T. F.  | 1.037 | = | 115 |
| TOTAL UA (BTU/HR*F) |   |             |       |             |       |   | 665 |

E M C ENGINEERS, INC.  
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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |               |            |                    |
|----------------------|---------------|------------|--------------------|
| BLDG NO:             | 8021          | BLDG NAME: | ADM & SUPPORT BLDG |
| BLDG FUNCTION:       | ADMIN/SUPPORT |            |                    |
| FLOOR AREA: (SQ. FT) | 23,486        | # FLOORS:  | 1                  |
| SLAB PERIMETER: (FT) | 679           |            |                    |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W  | SOUTH-E | TOTAL  |
|---|----------|---------|----------------|----------|---------|--------|
| WALLS, GROSS  | (SQ. FT) | 3,600   | 1,435          | 1,435    | 3,600   | 10,069 |
| GLASS   | (SQ. FT) | 448     | 0              | 0        | 0       | 448    |
| PERSONNEL DOOR  | (SQ. FT) | 86      | 0              | 0        | 344     | 430    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0      |
| WALLS, NET  | (SQ. FT) | 3,066   | 1,435          | 1,435    | 3,256   | 9,191  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 23,486 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) |         | 430    |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS                           | R-VALUE                        |
|---------------------------------------|--------------|--------------------------------------|--------------------------------|
|                                       |              | 1. OUTSIDE AIR FILM                  | 0.17                           |
|                                       |              | 2. PRE-FAB FASCIA                    | 1.17                           |
|                                       |              | 3. 3/4" PLYWOOD BACK-UP              | 0.83                           |
|                                       |              | 4. 3" BATT INSULATION                | 12.00                          |
|                                       |              | 5.                                   |                                |
|                                       |              | 6.                                   |                                |
|                                       |              | 7. INSIDE AIR FILM                   | 0.68                           |
|                                       |              | TOTAL R-WALL =                       | 14.85                          |
|                                       |              | U=1/R                                | 0.067                          |
|                                       |              | ROOF: (SKETCH CROSS SECTION OF ROOF) |                                |
|                                       |              | 1. OUTSIDE AIR FILM                  | 0.17                           |
|                                       |              | 2. BUILT UP ROOF                     | 0.34                           |
|                                       |              | 3. RIGID INSULATION, 2"              | 5.56                           |
|                                       |              | 4.                                   |                                |
|                                       |              | 5.                                   |                                |
|                                       |              | 6.                                   |                                |
|                                       |              | 7. INSIDE AIR FILM                   | 0.61                           |
|                                       |              | TOTAL R-ROOF =                       | 6.68                           |
|                                       |              | U=1/R                                | 0.150                          |
|                                       |              | GLASS TYPE:                          | DOUBLE HUNG IN ALUMINUM FRAMES |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                                  | 0.83                           |
| BASEMENT TYPE:                        | CONCRETE     | R-BASEM.                             | 10.00                          |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR                              | 0.00                           |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR                              | 1.81                           |

#### III. INFILTRATION:

|                                   |                       |                          |       |              |       |   |     |
|-----------------------------------|-----------------------|--------------------------|-------|--------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 0 X 0.33 Sq.In./LF=   | Sq.In.                   | 0     | X CFM/Sq.In. | 1.530 | = | 0   |
| PERSONNEL DOORS (SF)              | 430 X 0.16 Sq.In./SF= | Sq.In.                   | 69    | X CFM/Sq.In. | 1.530 | = | 105 |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       | X CFM / OPENING / HR     | 1.600 | =            |       |   | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       | X CFM / OPENING / HR     | 1.385 | =            |       |   | 0   |
|                                   |                       | TOTAL INFILTRATION (CFM) |       | =            |       |   | 105 |

|              |   |             |        |                     |       |   |       |
|--------------|---|-------------|--------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 0      | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 430    | X DOOR "U"          | 0.552 | = | 238   |
| UA WALL      | = | WALL AREA   | 9,191  | X WALL "U"          | 0.067 | = | 619   |
| UA ROOF      | = | ROOF AREA   | 23,486 | X ROOF "U"          | 0.150 | = | 3,519 |
| UA GLASS     | = | GLASS AREA  | 448    | X GLASS "U"         | 1.000 | = | 448   |
| UA SLAB      | = | SLAB PERIM. | 679    | X SLF               | 0.830 | = | 564   |
| UA BASEM.    | = | B-WALL AREA | 0      | X BASE "U"          | 0.100 | = | 0     |
| INFILTRATION | = | CFM         | 105    | X A. T. F.          | 1.037 | = | 109   |
|              |   |             |        | TOTAL UA (BTU/HR°F) |       |   | 5,496 |

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 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
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 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |          |            |                      |
|----------------------|----------|------------|----------------------|
| BLDG NO:             | 8042     | BLDG NAME: | ENL BARRACKS W/O DIN |
| BLDG FUNCTION:       | BARRACKS |            |                      |
| FLOOR AREA: (SQ. FT) | 20,349   | # FLOORS:  | 3                    |
| SLAB PERIMETER: (FT) | 634      |            |                      |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

| T. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)        |          | NORTH-W | NORTH-E        | SOUTH-W | SOUTH-E  | TOTAL  |
|---|----------|---------|----------------|---------|----------|--------|
| WALLS, GROSS  | (SQ. FT) | 5,306   | 4,491          | 4,491   | 5,306    | 19,594 |
| GLASS   | (SQ. FT) | 936     | 0              | 0       | 744      | 1,680  |
| PERSONNEL DOOR  | (SQ. FT) | 0       | 126            | 126     | 28       | 280    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0       | 0        | 0      |
| WALLS, NET  | (SQ. FT) | 4,370   | 4,365          | 4,365   | 4,534    | 17,634 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) |          |         |                |         | (SQ. FT) | 6,783  |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR |         | (SQ. FT) | 280    |
| BASEMENT WALLS  | (SQ. FT) |         |                |         |          | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

II. CONSTRUCTION: ( [ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL)  |              | COMPONENTS          | R-VALUE |
|--|--------------|---------------------|---------|
| *COMPOSITE= JUMBO BRICK - 1.8<br>1/4" ASBESTOS CEMENT - .034<br>PRE-FAB FASCIA PANELS - 1.17 | 1.           | OUTSIDE AIR FILM    | 0.17    |
|  | 2.           | COMPOSITE*          | 1.50    |
|  | 3.           | 2" RIGID INSULATION | 5.56    |
|  | 4.           | 1" AIR SPACE        | 1.00    |
|  | 5.           | 6" CMU              | 0.92    |
|  | 6.           |                     |         |
|  | 7.           | INSIDE AIR FILM     | 0.68    |
|  |              | TOTAL R-WALL =      | 9.83    |
|  |              | U=1/R               | 0.102   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)   |              | COMPONENTS          | R-VALUE |
|  | 1.           | OUTSIDE AIR FILM    | 0.17    |
|  | 2.           | BUILT UP ROOF       | 0.33    |
|  | 3.           | 3" RIGID INSULATION | 8.34    |
|  | 4.           | 2.5" CONCRETE DECK  | 0.21    |
|  | 5.           |                     |         |
|  | 6.           |                     |         |
|  | 7.           | INSIDE AIR FILM     | 0.68    |
|  |              | TOTAL R-ROOF =      | 9.73    |
|  | U=1/R        | 0.103               |         |
| GLASS TYPE:  | SINGLE PANE  | R-GLASS             | 0.90    |
| SLAB TYPE FLOOR:   | CONCRETE     | SLF                 | 0.68    |
| BASEMENT TYPE:   | NONE         | R-BASEM.            | 0.00    |
| OVERHEAD DOOR TYPE:  | NONE         | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE:   | HOLLOW METAL | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                        |        |                          |              |       |   |     |
|-----------------------------------|------------------------|--------|--------------------------|--------------|-------|---|-----|
| INFILTRATION:                     |                        |        |                          |              |       |   |     |
| WINDOWS (LF of Crack)             | 1416 X 0.33 Sq.In./LF= | Sq.In. | 467                      | X CFM/Sq.In. | 1.530 | = | 715 |
| PERSONNEL DOORS (SF)              | 280 X 0.16 Sq.In./SF=  | Sq.In. | 45                       | X CFM/Sq.In. | 1.530 | = | 69  |
|                                   |                        |        |                          |              |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                        | 12     | X CFM / OPENING /HR      |              | 1.600 | = | 19  |
| DOOR OPENINGS / HR - DOUBLE DOORS |                        |        | X CFM / OPENING /HR      |              | 1.385 | = | 0   |
|                                   |                        |        | TOTAL INFILTRATION (CFM) |              |       | = | 803 |

|                     |   |             |        |             |       |   |       |
|---------------------|---|-------------|--------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0      | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 280    | X DOOR "U"  | 0.552 | = | 155   |
| UA WALL             | = | WALL AREA   | 17,634 | X WALL "U"  | 0.102 | = | 1,795 |
| UA ROOF             | = | ROOF AREA   | 6,783  | X ROOF "U"  | 0.103 | = | 697   |
| UA GLASS            | = | GLASS AREA  | 1,680  | X GLASS "U" | 1.111 | = | 1,867 |
| UA SLAB             | = | SLAB PERIM. | 634    | X SLF       | 0.680 | = | 431   |
| UA BASEM.           | = | B-WALL AREA | 0      | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 803    | X A. T. F.  | 1.037 | = | 832   |
| TOTAL UA (BTU/HR°F) |   |             |        | 5,777       |       |   |       |



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DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |                 |
|----------------------|-------|------------|-----------------|
| BLDG NO:             | 8044  | BLDG NAME: | APP INSTR BLDG. |
| BLDG FUNCTION:       |       |            |                 |
| FLOOR AREA: (SQ. FT) | 2,467 | # FLOORS:  | 1               |
| SLAB PERIMETER: (FT) | 199   |            |                 |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST | WEST     | TOTAL          |
|---|----------|-------|----------------|------|----------|----------------|
| WALLS, GROSS  | (SQ. FT) | 646   | 646            | 646  | 646      | 2,583          |
| GLASS   | (SQ. FT) | 48    | 48             | 36   | 24       | 156            |
| PERSONNEL DOOR  | (SQ. FT) | 0     | 28             | 21   | 42       | 91             |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0    | 0        | 0              |
| WALLS, NET  | (SQ. FT) | 598   | 570            | 589  | 580      | 2,336          |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) |          |       |                |      |          | (SQ. FT) 2,467 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR |      | (SQ. FT) | 91             |
| BASEMENT WALLS  | (SQ. FT) |       |                |      |          | 0              |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS               | R-VALUE |
|---------------------------------------|--------------|--------------------------|---------|
|                                       |              | 1. OUTSIDE AIR FILM      | 0.17    |
|                                       |              | 2. 4" BRICK              | 1.20    |
|                                       |              | 3. AIR SPACE             | 1.00    |
|                                       |              | 4. 8" CONCRETE           | 1.11    |
|                                       |              | 5. AIR SPACE             | 1.00    |
|                                       |              | 6. 1/2" GWB              | 0.45    |
|                                       |              | 7. INSIDE AIR FILM       | 0.68    |
|                                       |              | TOTAL R-WALL =           | 5.61    |
|                                       |              | U=1/R                    | 0.178   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS               | R-VALUE |
|                                       |              | 1. OUTSIDE AIR FILM      | 0.17    |
|                                       |              | 2. BUR                   | 0.33    |
|                                       |              | 3. URETHANE BD.          | 16.29   |
|                                       |              | 4. 3/4" WOOD             | 0.83    |
|                                       |              | 5. AIR SPACE             | 1.00    |
|                                       |              | 6. ACOUSTIC TILE CEILING | 1.25    |
|                                       |              | 7. INSIDE AIR FILM       | 0.68    |
|                                       |              | TOTAL R-ROOF =           | 20.55   |
|                                       |              | U=1/R                    | 0.049   |
| GLASS TYPE:                           | DOUBLE PANE  | R-GLASS                  | 1.75    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                      | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.                 | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR                  | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR                  | 1.81    |

#### III. INFILTRATION:

|                                   |                       |                      |       |                          |       |    |    |
|-----------------------------------|-----------------------|----------------------|-------|--------------------------|-------|----|----|
| WINDOWS (LF of Crack)             | 130 X 0.27 Sq.In./LF= | Sq.In.               | 35    | X CFM/Sq.In.             | 1.530 | =  | 54 |
| PERSONNEL DOORS (SF)              | 91 X 0.16 Sq.In./SF=  | Sq.In.               | 15    | X CFM/Sq.In.             | 1.530 | =  | 22 |
|                                   |                       |                      |       |                          |       |    |    |
| DOOR OPENINGS / HR - SINGLE DOOR  | 4                     | X CFM / OPENING / HR | 1.600 | =                        | 6     |    |    |
| DOOR OPENINGS / HR - DOUBLE DOORS | 4                     | X CFM / OPENING / HR | 1.385 | =                        | 6     |    |    |
|                                   |                       |                      |       | TOTAL INFILTRATION (CFM) | =     | 88 |    |

|              |   |             |       |                     |       |   |     |
|--------------|---|-------------|-------|---------------------|-------|---|-----|
| UA ODOOR     | = | ODOOR AREA  | 0     | X DOOR "U"          | 0.000 | = | 0   |
| UA PDOOR     | = | PDOOR AREA  | 91    | X DOOR "U"          | 0.552 | = | 50  |
| UA WALL      | = | WALL AREA   | 2,336 | X WALL "U"          | 0.178 | = | 416 |
| UA ROOF      | = | ROOF AREA   | 2,467 | X ROOF "U"          | 0.049 | = | 120 |
| UA GLASS     | = | GLASS AREA  | 156   | X GLASS "U"         | 0.571 | = | 89  |
| UA SLAB      | = | SLAB PERIM. | 199   | X SLF               | 0.680 | = | 135 |
| UA BASEM.    | = | B-WALL AREA | 0     | X BASE "U"          | 0.000 | = | 0   |
| INFILTRATION | = | CFM         | 88    | X A. T. F.          | 1.037 | = | 91  |
|              |   |             |       | TOTAL UA (BTU/HR°F) |       |   | 902 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |              |
|----------------------|--------|------------|--------------|
| BLDG NO:             | 8063   | BLDG NAME: | ENL PERS DIN |
| BLDG FUNCTION:       | DINING |            |              |
| FLOOR AREA: (SQ. FT) | 17,663 | # FLOORS:  | 1            |
| SLAB PERIMETER: (FT) | 355    |            |              |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-E | NORTH-W        | SOUTH-E  | SOUTH-W | TOTAL  |
|---|----------|---------|----------------|----------|---------|--------|
| WALLS, GROSS  | (SQ. FT) | 2,310   | 2,940          | 2,940    | 2,310   | 10,500 |
| GLASS   | (SQ. FT) | 654     | 398            | 368      | 27      | 1,447  |
| PERSONNEL DOOR  | (SQ. FT) | 84      | 168            | 84       | 63      | 399    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0        | 0       | 0      |
| WALLS, NET  | (SQ. FT) | 1,572   | 2,374          | 2,488    | 2,220   | 8,654  |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |          |         | 17,663 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR | (SQ. FT) | 399     |        |
| BASEMENT WALLS  | (SQ. FT) |         |                |          |         | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|   |              |                          |         |
|---|--------------|--------------------------|---------|
| II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)   |              |                          |         |
| WALLS: (SKETCH CROSS SECTION OF WALL)   |              | COMPONENTS               | R-VALUE |
| COMPOSITE<br>6" JUMBO BRICK = 1.8<br>CEMENT ASBESTOS PANELS = .034<br>PRE-FAB FASCIA = 1.17<br>COMPOSITE = 1.41 |              | 1. OUTSIDE AIR FILM      | 0.17    |
|   |              | 2. 8" REINF. CMU         | 1.11    |
|   |              | 3. COMPOSITE             | 1.41    |
|   |              | 4. 2" RIGID INSUL.       | 5.56    |
|   |              | 5. AIR SPACE             | 1.00    |
|   |              | 6.                       |         |
|   |              | 7. INSIDE AIR FILM       | 0.68    |
|   |              | TOTAL R-WALL =           | 9.93    |
|   |              | U=1/R                    | 0.101   |
|   |              |                          |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS               | R-VALUE |
|   |              | 1. OUTSIDE AIR FILM      | 0.17    |
|   |              | 2. BUR.                  | 0.33    |
|   |              | 3. 2" RIGID INSUL        | 5.56    |
|   |              | 4. 2" BATT INSUL.        | 8.00    |
|   |              | 5. AIR SPACE             | 1.00    |
|   |              | 6. ACOUSTIC TILE CEILING | 1.25    |
|   |              | 7. INSIDE AIR FILM       | 0.68    |
|   |              | TOTAL R-ROOF =           | 16.99   |
|   |              | U=1/R                    | 0.059   |
|   |              |                          |         |
| GLASS TYPE:   | DOUBLE PANE  | R-GLASS                  | 1.75    |
| SLAB TYPE FLOOR:  | CONCRETE     | SLF                      | 0.68    |
| BASEMENT TYPE:  | NONE         | R-BASEM.                 | 0.00    |
| OVERHEAD DOOR TYPE:   | NONE         | R-ODOOR                  | 0.00    |
| PERSONNEL DOOR TYPE:  | HOLLOW METAL | R-PDOOR                  | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |    |                          |       |   |     |
|-----------------------------------|-----------------------|--------|----|--------------------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 0 X 0.27 Sq.In./LF=   | Sq.In. | 0  | X CFM/Sq.In.             | 1.530 | = | 0   |
| PERSONNEL DOORS (SF)              | 399 X 0.16 Sq.In./SF= | Sq.In. | 64 | X CFM/Sq.In.             | 1.530 | = | 98  |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        |    | X CFM / OPENING / HR     | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | 20 | X CFM / OPENING / HR     | 1.385 | = | 28  |
|                                   |                       |        |    | TOTAL INFILTRATION (CFM) |       | = | 125 |

|              |   |             |        |                     |       |   |       |
|--------------|---|-------------|--------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 0      | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 399    | X DOOR "U"          | 0.552 | = | 220   |
| UA WALL      | = | WALL AREA   | 8,654  | X WALL "U"          | 0.101 | = | 872   |
| UA ROOF      | = | ROOF AREA   | 17,663 | X ROOF "U"          | 0.059 | = | 1,040 |
| UA GLASS     | = | GLASS AREA  | 1,447  | X GLASS "U"         | 0.571 | = | 827   |
| UA SLAB      | = | SLAB PERIM. | 355    | X SLF               | 0.680 | = | 241   |
| UA BASEM.    | = | B-WALL AREA | 0      | X BASE. "U"         | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 125    | X A. T. F.          | 1.037 | = | 130   |
|              |   |             |        | TOTAL UA (BTU/HR°F) |       |   | 3,330 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                 |
|----------------------|--------|------------|-----------------|
| BLDG NO:             | 8065   | BLDG NAME: | CLINIC W/O BEDS |
| BLDG FUNCTION:       | CLINIC |            |                 |
| FLOOR AREA: (SQ. FT) | 3,574  | # FLOORS:  | 1               |
| SLAB PERIMETER: (FT) | 298    |            |                 |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH | SOUTH          | EAST     | WEST | TOTAL |
|---|----------|-------|----------------|----------|------|-------|
| WALLS, GROSS  | (SQ. FT) | 1,288 | 1,288          | 560      | 560  | 3,697 |
| GLASS   | (SQ. FT) | 24    | 24             | 20       | 0    | 68    |
| PERSONNEL DOOR  | (SQ. FT) | 56    | 0              | 0        | 42   | 98    |
| OVERHEAD DOOR   | (SQ. FT) | 0     | 0              | 0        | 0    | 0     |
| WALLS, NET  | (SQ. FT) | 1,208 | 1,264          | 540      | 518  | 3,531 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |       |                |          |      | 3,574 |
| OVERHEAD DOOR   | (SQ. FT) | 0     | PERSONNEL DOOR | (SQ. FT) |      | 98    |
| BASEMENT WALLS  | (SQ. FT) |       |                |          |      | 0     |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL)                         |                         | COMPONENTS       | R-VALUE |
|---|-------------------------|------------------|---------|
| COMPOSITE:<br>JUMBO BRICK (6") = 1.8<br>PRE-FAB FASCIA = 1.17 | 1.                      | OUTSIDE AIR FILM | 0.17    |
|   | 2.                      | COMPOSITE        | 1.66    |
|   | 3.                      | 8" CMU           | 1.11    |
|   | 4.                      | AIR SPACE        | 1.00    |
|   | 5.                      |                  |         |
|   | 6.                      |                  |         |
|   | 7.                      | INSIDE AIR FILM  | 0.68    |
|   |                         | TOTAL R-WALL =   | 4.62    |
|   |                         | U=1/R            | 0.216   |
|   |                         |                  |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)                          |                         | COMPONENTS       | R-VALUE |
|   | 1.                      | OUTSIDE AIR FILM | 0.17    |
|   | 2.                      | BUR              | 0.33    |
|   | 3.                      | 2" RIGID INSUL.  | 5.56    |
|   | 4.                      | AIR SPACE        | 1.00    |
|   | 5.                      | 1/2" GYPSUM BD.  | 0.45    |
|   | 6.                      |                  |         |
|   | 7.                      | INSIDE AIR FILM  | 0.68    |
|   |                         | TOTAL R-ROOF =   | 8.19    |
|   |                         | U=1/R            | 0.122   |
|   |                         |                  |         |
| GLASS TYPE:   | SINGLE PANE WITH STORMS | R-GLASS          | 1.60    |
| SLAB TYPE FLOOR:  | CONCRETE                | SLF              | 0.68    |
| BASEMENT TYPE:  | NONE                    | R-BASEM.         | 0.00    |
| OVERHEAD DOOR TYPE:   | NONE                    | R-ODOOR          | 0.00    |
| PERSONNEL DOOR TYPE:  | HOLLOW METAL            | R-PDOOR          | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                          |              |       |   |    |
|-----------------------------------|-----------------------|--------|--------------------------|--------------|-------|---|----|
| WINDOWS (LF of Crack)             | 132 X 0.33 Sq.In./LF= | Sq.In. | 44                       | X CFM/Sq.In. | 1.530 | = | 67 |
| PERSONNEL DOORS (SF)              | 98 X 0.16 Sq.In./SF=  | Sq.In. | 16                       | X CFM/Sq.In. | 1.530 | = | 24 |
|                                   |                       |        |                          |              |       |   |    |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM /OPENING /HR       | 1.600        | =     |   | 0  |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       | 2      | X CFM /OPENING /HR       | 1.385        | =     |   | 3  |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |              |       | = | 93 |

|                     |   |             |       |             |       |   |       |
|---------------------|---|-------------|-------|-------------|-------|---|-------|
| UA ODOOR            | = | ODOOR AREA  | 0     | X DOOR "U"  | 0.000 | = | 0     |
| UA PDOOR            | = | PDOOR AREA  | 98    | X DOOR "U"  | 0.552 | = | 54    |
| UA WALL             | = | WALL AREA   | 3,531 | X WALL "U"  | 0.216 | = | 764   |
| UA ROOF             | = | ROOF AREA   | 3,574 | X ROOF "U"  | 0.122 | = | 436   |
| UA GLASS            | = | GLASS AREA  | 68    | X GLASS "U" | 0.625 | = | 43    |
| UA SLAB             | = | SLAB PERIM. | 298   | X SLF       | 0.680 | = | 203   |
| UA BASEM.           | = | B-WALL AREA | 0     | X BASE. "U" | 0.000 | = | 0     |
| INFILTRATION        | = | CFM         | 93    | X A. T. F.  | 1.037 | = | 97    |
| TOTAL UA (BTU/HR°F) |   |             |       |             |       |   | 1,597 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |       |            |           |
|----------------------|-------|------------|-----------|
| BLDG NO:             | 8071  | BLDG NAME: | BTN HQTRS |
| BLDG FUNCTION:       |       |            |           |
| FLOOR AREA: (SQ. FT) | 9,963 | # FLOORS:  | 3         |
| SLAB PERIMETER: (FT) |       |            |           |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-W | NORTH-E        | SOUTH-W | SOUTH-E  | TOTAL |
|---|----------|---------|----------------|---------|----------|-------|
| WALLS, GROSS  | (SQ. FT) | 861     | 1,701          | 1,701   | 861      | 5,124 |
| GLASS   | (SQ. FT) | 186     | 198            | 198     | 186      | 768   |
| PERSONNEL DOOR  | (SQ. FT) | 0       | 42             | 42      | 0        | 84    |
| OVERHEAD DOOR   | (SQ. FT) | 0       | 0              | 0       | 0        | 0     |
| WALLS, NET  | (SQ. FT) | 675     | 1,461          | 1,461   | 675      | 4,272 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |         |                |         |          | 3,321 |
| OVERHEAD DOOR   | (SQ. FT) | 0       | PERSONNEL DOOR |         | (SQ. FT) | 84    |
| BASEMENT WALLS  | (SQ. FT) | 328     | 648            | 648     | 328      | 1,952 |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |                | COMPONENTS            | R-VALUE |
|---------------------------------------|----------------|-----------------------|---------|
|                                       | 1.             | OUTSIDE AIR FILM      | 0.17    |
|                                       | 2.             | 4" BRICK              | 1.20    |
|                                       | 3.             | AIR SPACE             | 1.00    |
|                                       | 4.             | 4" CMU                | 0.72    |
|                                       | 5.             | AIR SPACE             | 1.00    |
|                                       | 6.             | 1/4" GYPSUM BD.       | 0.45    |
|                                       | 7.             | INSIDE AIR FILM       | 0.68    |
|                                       | TOTAL R-WALL = |                       | 5.22    |
|                                       | U=1/R          |                       | 0.192   |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |                | COMPONENTS            | R-VALUE |
|                                       | 1.             | OUTSIDE AIR FILM      | 0.17    |
|                                       | 2.             | BUR                   | 0.33    |
|                                       | 3.             | GYPSUM DECK           | 0.35    |
|                                       | 4.             | 2" RIGID INSULATION   | 5.56    |
|                                       | 5.             | AIR SPACE             | 1.00    |
|                                       | 6.             | ACOUSTIC TILE CEILING | 1.25    |
|                                       | 7.             | INSIDE AIR FILM       | 0.68    |
|                                       | TOTAL R-ROOF = |                       | 9.34    |
| U=1/R                                 |                | 0.107                 |         |
| GLASS TYPE:                           | SINGLE PANE    | R-GLASS               | 0.90    |
| SLAB TYPE FLOOR:                      | CONCRETE       | SLF                   | 0.68    |
| BASEMENT TYPE:                        | NONE           | R-BASEM.              | 10.00   |
| OVERHEAD DOOR TYPE:                   | NONE           | R-ODOOR               | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL   | R-PDOOR               | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |     |                          |       |   |     |
|-----------------------------------|-----------------------|--------|-----|--------------------------|-------|---|-----|
| III. INFILTRATION:                |                       |        |     |                          |       |   |     |
| WINDOWS (LF of Crack)             | 482 X 0.33 Sq.In./LF= | Sq.In. | 159 | X CFM/Sq.In.             | 1.530 | = | 243 |
| PERSONNEL DOORS (SF)              | 84 X 0.16 Sq.In./SF=  | Sq.In. | 13  | X CFM/Sq.In.             | 1.530 | = | 21  |
|                                   |                       |        |     |                          |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        |     | X CFM /OPENING /HR       | 1.600 | = | 0   |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | 2   | X CFM /OPENING /HR       | 1.385 | = | 3   |
|                                   |                       |        |     | TOTAL INFILTRATION (CFM) |       | = | 267 |

|              |   |             |       |                     |       |       |     |
|--------------|---|-------------|-------|---------------------|-------|-------|-----|
| UA ODOOR     | = | ODOOR AREA  | 0     | X DOOR "U"          | 0.000 | =     | 0   |
| UA PDOOR     | = | PDOOR AREA  | 84    | X DOOR "U"          | 0.552 | =     | 46  |
| UA WALL      | = | WALL AREA   | 4,272 | X WALL "U"          | 0.192 | =     | 818 |
| UA ROOF      | = | ROOF AREA   | 3,321 | X ROOF "U"          | 0.107 | =     | 356 |
| UA GLASS     | = | GLASS AREA  | 768   | X GLASS "U"         | 1.111 | =     | 853 |
| UA SLAB      | = | SLAB PERIM. | 0     | X SLF               | 0.680 | =     | 0   |
| UA BASEM.    | = | B-WALL AREA | 1,952 | X BASE. "U"         | 0.100 | =     | 195 |
| INFILTRATION | = | CFM         | 267   | X A. T. F.          | 1.037 | =     | 277 |
|              |   |             |       | TOTAL UA (BTU/HR*F) |       | 2,545 |     |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 18-Jul-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                     |        |            |                  |
|---------------------|--------|------------|------------------|
| BLDG NO:            | 8360   | BLDG NAME: | VEH MNT SHOP ORG |
| BLDG FUNCTION:      | MAINT  |            |                  |
| FLOOR AREA (SQ. FT) | 44,905 | # FLOORS:  | 1                |
| SLAB PERIMETER (FT) | 1,019  |            |                  |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH-E | NORTH-W        | SOUTH-E | SOUTH-W  | TOTAL           |
|---|----------|---------|----------------|---------|----------|-----------------|
| WALLS, GROSS  | (SQ. FT) | 9,407   | 8,106          | 8,106   | 9,407    | 35,027          |
| GLASS   | (SQ. FT) | 206     | 136            | 48      | 0        | 390             |
| PERSONNEL DOOR  | (SQ. FT) | 84      | 63             | 126     | 21       | 294             |
| OVERHEAD DOOR   | (SQ. FT) | 6,512   | 3,807          | 3,951   | 6,512    | 20,782          |
| WALLS, NET  | (SQ. FT) | 2,605   | 4,100          | 3,951   | 2,874    | 13,561          |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) |          |         |                |         |          | (SQ. FT) 44,905 |
| OVERHEAD DOOR   | (SQ. FT) | 20,782  | PERSONNEL DOOR |         | (SQ. FT) | 294             |
| BASEMENT WALLS  | (SQ. FT) |         |                |         |          | 0               |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPOSITES:         | R-VALUE |
|---------------------------------------|--------------|---------------------|---------|
| COMPONENTS:                           |              | 1. NE WALL          | 3.77    |
| 12" CONC BLOCK W/ LOOSE FILL = 3.7    |              | 2. NW WALL          | 8.78    |
| 6" BATT INSUL. = 19                   |              | 3. SE WALL          | 8.78    |
| METAL PANEL W/3" INSUL. = 11          |              | 4. SW WALL          | 5.76    |
| O'HEAD DOORS = .125                   |              | 5.                  |         |
| OA FILM = .17                         |              | 6.                  |         |
| IA FILM = .68                         |              | 7.                  |         |
|                                       |              | COMP. R-WALL =      | 7.18    |
|                                       |              | U=1/R               | 0.139   |
|                                       |              |                     |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS          | R-VALUE |
|                                       |              | 1. OUTSIDE AIR FILM | 0.17    |
|                                       |              | 2. BUR              | 0.33    |
|                                       |              | 3. 2" RIGID INSUL.  | 5.56    |
|                                       |              | 4.                  |         |
|                                       |              | 5.                  |         |
|                                       |              | 6.                  |         |
|                                       |              | 7. INSIDE AIR FILM  | 0.68    |
|                                       |              | TOTAL R-ROOF =      | 6.74    |
|                                       |              | U=1/R               | 0.148   |
| GLASS TYPE:                           | SINGLE PANEL | R-GLASS             | 0.90    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                 | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM             | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR             | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR             | 1.81    |

#### III. INFILTRATION:

|                                   |                       |        |                          |              |       |   |    |
|-----------------------------------|-----------------------|--------|--------------------------|--------------|-------|---|----|
| WINDOWS (LF of Cash)              | 0 X 0.27 Sq.In./LF=   | Sq.In. | 0                        | X CFM/Sq in. | 1.530 | = | 0  |
| PERSONNEL DOORS (SF)              | 294 X 0.16 Sq.in./SF= | Sq.in. | 47                       | X CFM/Sq In. | 1.530 | = | 72 |
|                                   |                       |        |                          |              |       |   |    |
| DOOR OPENINGS / HR - SINGLE DOOR  |                       |        | X CFM / OPENING /HR      | 1.600        | =     |   | 0  |
| DOOR OPENINGS / HR - DOUBLE DOORS |                       |        | X CFM / OPENING /HR      | 1.365        | =     |   | 0  |
|                                   |                       |        | TOTAL INFILTRATION (CFM) |              | =     |   | 72 |

|              |   |             |        |                     |       |   |       |
|--------------|---|-------------|--------|---------------------|-------|---|-------|
| UA ODOOR     | = | ODOOR AREA  | 20,782 | X DOOR "U"          | 0.000 | = | 0     |
| UA PDOOR     | = | PDOOR AREA  | 294    | X DOOR "U"          | 0.552 | = | 162   |
| UA WALL      | = | WALL AREA   | 13,561 | X WALL "U"          | 0.139 | = | 1,889 |
| UA ROOF      | = | ROOF AREA   | 44,905 | X ROOF "U"          | 0.148 | = | 6,663 |
| UA GLASS     | = | GLASS AREA  | 390    | X GLASS "U"         | 1.111 | = | 433   |
| UA SLAB      | = | SLAB PERIM  | 1,019  | X SLF               | 0.680 | = | 693   |
| UA BASEM     | = | B-WALL AREA | 0      | X BASE "U"          | 0.000 | = | 0     |
| INFILTRATION | = | CFM         | 72     | X A.T.F.            | 0.852 | = | 61    |
|              |   |             |        | TOTAL UA (BTU/HR°F) |       |   | 9,901 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                  |
|----------------------|--------|------------|------------------|
| BLDG NO:             | 8380   | BLDG NAME: | VEH MNT SHOP ORG |
| BLDG FUNCTION:       | MAINT  |            |                  |
| FLOOR AREA: (SQ. FT) | 82,472 | # FLOORS:  |                  |
| SLAB PERIMETER: (FT) | 2,118  |            |                  |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH  | SOUTH  | EAST  | WEST  | TOTAL  |
|---|----------|--------|--------|-------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 16,326 | 16,326 | 6,827 | 6,827 | 46,306 |
| GLASS   | (SQ. FT) | 1,704  | 1,914  | 144   | 144   | 3,906  |
| PERSONNEL DOOR  | (SQ. FT) | 301    | 189    | 105   | 168   | 763    |
| OVERHEAD DOOR   | (SQ. FT) | 5,366  | 6,014  | 540   | 0     | 11,920 |
| WALLS, NET  | (SQ. FT) | 8,955  | 8,209  | 6,038 | 6,515 | 29,717 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |        |        |       |       | 77,775 |
| OVERHEAD DOOR   | (SQ. FT) | 11,920 |        |       |       | 763    |
| BASEMENT WALLS  | (SQ. FT) |        |        |       |       | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

|   |  |                                      |                     |            |
|---|--|--------------------------------------|---------------------|------------|
| II. CONSTRUCTION: (1 ) FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES) |  | COMPONENTS                           |                     | R-VALUE    |
| WALLS: (SKETCH CROSS SECTION OF WALL)                                 |  | 1.                                   | OUTSIDE AIR FILM    | 0.17       |
|   |  | 2.                                   | 2" INS. METAL PANEL | 7.33       |
|   |  | 3.                                   | 2" AIR SPACE        | 1.00       |
|   |  | 4.                                   | 8" CONC. BLOCK      | 1.11       |
|   |  | 5.                                   |                     |            |
|   |  | 6.                                   |                     |            |
|   |  | 7.                                   | INSIDE AIR FILM     | 0.68       |
|   |  | TOTAL R-WALL =                       |                     | 10.29      |
|   |  | U=1/R                                |                     | 0.097      |
|   |  | ROOF: (SKETCH CROSS SECTION OF ROOF) |                     | COMPONENTS |
|   |  | 1.                                   | OUTSIDE AIR FILM    | 0.17       |
|   |  | 2.                                   | METAL STANDING SEAM | 0.00       |
|   |  | 3.                                   | 3" RIGID INSUL.     | 8.34       |
|   |  | 4.                                   | METAL DECK          | 0.00       |
|   |  | 5.                                   |                     |            |
|   |  | 6.                                   |                     |            |
|   |  | 7.                                   | INSIDE AIR FILM     | 0.68       |
|   |  | TOTAL R-ROOF =                       |                     | 9.19       |
|   |  | U=1/R                                |                     | 0.109      |
| GLASS TYPE:   |  | DOUBLE PANE                          | R-GLASS             | 1.75       |
| SLAB TYPE FLOOR:  |  | CONCRETE                             | SLF                 | 0.68       |
| BASEMENT TYPE:  |  | NONE                                 | R-BASEM.            | 0.00       |
| OVERHEAD DOOR TYPE:   |  | NONE                                 | R-ODOOR             | 0.00       |
| PERSONNEL DOOR TYPE:  |  | HOLLOW METAL                         | R-PDOOR             | 1.61       |

#### III. INFILTRATION:

|                                   |                       |                      |       |                          |       |   |     |
|-----------------------------------|-----------------------|----------------------|-------|--------------------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 304 X 0.33 Sq.In./LF= | Sq.In.               | 100   | X CFM/Sq.In.             | 1.530 | = | 153 |
| PERSONNEL DOORS (SF)              | 763 X 0.16 Sq.In./SF= | Sq.In.               | 122   | X CFM/Sq.In.             | 1.530 | = | 187 |
| OVERHEAD DOOR                     |                       |                      |       |                          |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  | 15                    | X CFM / OPENING / HR | 1.600 | =                        |       |   | 24  |
| DOOR OPENINGS / HR - DOUBLE DOORS | 8                     | X CFM / OPENING / HR | 1.385 | =                        |       |   | 11  |
|                                   |                       |                      |       | TOTAL INFILTRATION (CFM) |       | = | 375 |

|              |   |             |        |                     |       |   |        |
|--------------|---|-------------|--------|---------------------|-------|---|--------|
| UA ODOOR     | = | ODOOR AREA  | 11,920 | X DOOR "U"          | 0.090 | = | 0      |
| UA PDOOR     | = | PDOOR AREA  | 763    | X DOOR "U"          | 0.552 | = | 422    |
| UA WALL      | = | WALL AREA   | 29,717 | X WALL "U"          | 0.097 | = | 2,888  |
| UA ROOF      | = | ROOF AREA   | 77,775 | X ROOF "U"          | 0.109 | = | 8,463  |
| UA GLASS     | = | GLASS AREA  | 3,906  | X GLASS "U"         | 0.571 | = | 2,232  |
| UA SLAB      | = | SLAB PERIM. | 2,118  | X SLF               | 0.680 | = | 1,440  |
| UA BASEM.    | = | B-WALL AREA | 0      | X BASE "U"          | 0.000 | = | 0      |
| INFILTRATION | = | CFM         | 375    | X A. T. F.          | 1.037 | = | 389    |
|              |   |             |        | TOTAL UA (BTU/HR°F) |       | = | 15,834 |

E M C ENGINEERS, INC.  
 PROJECT: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS  
 CLIENT CONTRACT NO.: DACA 01-94-D-0033  
 CLIENT: CORPS OF ENGINEERS, KANSAS CITY  
 LOCATION: FT. RILEY, KANSAS

DATE: 12-Jun-95  
 BY: AMS  
 JOB: 1406.001  
 CHK: AJN  
 FILE:

### BUILDING HEATING LOAD CALCULATION SHEET

|                      |        |            |                  |
|----------------------|--------|------------|------------------|
| BLDG NO:             | 8410   | BLDG NAME: | VEH MNT SHOP ORG |
| BLDG FUNCTION:       | MAINT  |            |                  |
| FLOOR AREA: (SQ. FT) | 73,376 | # FLOORS:  |                  |
| SLAB PERIMETER: (FT) | 2,118  |            |                  |

#### I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

|   |          | NORTH  | SOUTH  | EAST  | WEST  | TOTAL  |
|---|----------|--------|--------|-------|-------|--------|
| WALLS, GROSS  | (SQ. FT) | 16,326 | 16,326 | 6,827 | 6,827 | 46,306 |
| GLASS   | (SQ. FT) | 1,704  | 1,914  | 144   | 144   | 3,906  |
| PERSONNEL DOOR  | (SQ. FT) | 301    | 189    | 105   | 168   | 763    |
| OVERHEAD DOOR   | (SQ. FT) | 5,366  | 6,014  | 540   | 0     | 11,920 |
| WALLS, NET  | (SQ. FT) | 8,955  | 8,209  | 6,038 | 6,515 | 29,717 |
| ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED) | (SQ. FT) |        |        |       |       | 77,775 |
| OVERHEAD DOOR   | (SQ. FT) | 11,920 |        |       |       | 763    |
| BASEMENT WALLS  | (SQ. FT) |        |        |       |       | 0      |

#### II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

| WALLS: (SKETCH CROSS SECTION OF WALL) |              | COMPONENTS             | R-VALUE |
|---------------------------------------|--------------|------------------------|---------|
|                                       |              | 1. OUTSIDE AIR FILM    | 0.17    |
|                                       |              | 2. 2" INS. METAL PANEL | 7.33    |
|                                       |              | 3. 2" AIR SPACE        | 1.00    |
|                                       |              | 4. 8" CONC. BLOCK      | 1.11    |
|                                       |              | 5.                     |         |
|                                       |              | 6.                     |         |
|                                       |              | 7. INSIDE AIR FILM     | 0.68    |
|                                       |              | TOTAL R-WALL =         |         |
| U=1/R                                 |              | 0.097                  |         |
| ROOF: (SKETCH CROSS SECTION OF ROOF)  |              | COMPONENTS             | R-VALUE |
|                                       |              | 1. OUTSIDE AIR FILM    | 0.17    |
|                                       |              | 2. METAL STANDING SEAM | 0.00    |
|                                       |              | 3. 3" RIGID INSUL.     | 8.34    |
|                                       |              | 4. METAL DECK          | 0.00    |
|                                       |              | 5.                     |         |
|                                       |              | 6.                     |         |
|                                       |              | 7. INSIDE AIR FILM     | 0.68    |
|                                       |              | TOTAL R-ROOF =         |         |
| U=1/R                                 |              | 0.109                  |         |
| GLASS TYPE:                           | DOUBLE PANE  | R-GLASS                | 1.75    |
| SLAB TYPE FLOOR:                      | CONCRETE     | SLF                    | 0.68    |
| BASEMENT TYPE:                        | NONE         | R-BASEM.               | 0.00    |
| OVERHEAD DOOR TYPE:                   | NONE         | R-ODOOR                | 0.00    |
| PERSONNEL DOOR TYPE:                  | HOLLOW METAL | R-PDOOR                | 1.81    |

#### III. INFILTRATION:

|                                   |                          |                      |       |              |       |   |     |
|-----------------------------------|--------------------------|----------------------|-------|--------------|-------|---|-----|
| WINDOWS (LF of Crack)             | 304 X 0.33 Sq.In./LF=    | Sq.In.               | 100   | X CFM/Sq.In. | 1.530 | = | 153 |
| PERSONNEL DOORS (SF)              | 763 X 0.16 Sq.In./SF=    | Sq.In.               | 122   | X CFM/Sq.In. | 1.530 | = | 187 |
| OVERHEAD DOOR                     |                          |                      |       |              |       |   |     |
| DOOR OPENINGS / HR - SINGLE DOOR  | 15                       | X CFM / OPENING / HR | 1.600 | =            | 24    |   |     |
| DOOR OPENINGS / HR - DOUBLE DOORS | 8                        | X CFM / OPENING / HR | 1.385 | =            | 11    |   |     |
|                                   | TOTAL INFILTRATION (CFM) |                      |       |              |       | = | 375 |

|              |   |             |        |                     |       |   |        |
|--------------|---|-------------|--------|---------------------|-------|---|--------|
| UA ODOOR     | = | ODOOR AREA  | 11,920 | X DOOR "U"          | 0.000 | = | 0      |
| UA PDOOR     | = | PDOOR AREA  | 763    | X DOOR "U"          | 0.552 | = | 422    |
| UA WALL      | = | WALL AREA   | 29,717 | X WALL "U"          | 0.097 | = | 2,888  |
| UA ROOF      | = | ROOF AREA   | 77,775 | X ROOF "U"          | 0.109 | = | 8,463  |
| UA GLASS     | = | GLASS AREA  | 3,906  | X GLASS "U"         | 0.571 | = | 2,232  |
| UA SLAB      | = | SLAB PERIM. | 2,118  | X SLF               | 0.680 | = | 1,440  |
| UA BASEM.    | = | B-WALL AREA | 0      | X BASE "U"          | 0.000 | = | 0      |
| INFILTRATION | = | CFM         | 375    | X A. T. F.          | 1.037 | = | 389    |
|              |   |             |        | TOTAL UA (BTU/HR°F) |       |   | 15,834 |